

THE green scene

HORTICULTURE IN THE DELAWARE VALLEY

SEPTEMBER • OCTOBER • 1974

\$1.00

wildflower rescue





8



20



14



22



2



THE green scene

HORTICULTURE IN THE DELAWARE VALLEY

Volume 3, Number 1 Sept., Oct., 1974

published by
THE PENNSYLVANIA
HORTICULTURAL SOCIETY
325 Walnut Street, Philadelphia, Pa. 19106

Ernesta D. Ballard/*President*
Jean Byrne/*Editor*

PUBLICATIONS COMMITTEE
L. Wilbur Zimmerman/*Chairman*
Charlotte L. Archer
M. M. Brubaker
Frederic W. Clark
George M. Harding
Nancy Howard
Craig S. Oliver
Ralph M. Sargent

DESIGNER
Julie Baxendell
Baxendell Design Associates

THE GREEN SCENE, Volume 3, No. 1, published bimonthly, January, March, May, July, September, November, by the Pennsylvania Horticultural Society, a non-profit membership organization at 325 Walnut Street, Philadelphia, Pa. 19106. Subscription: \$5.00 — Single Copy: \$1.00. Second class postage paid at Philadelphia, Pa. 19104.

POSTMASTER: Send Form No. 3579 to THE GREEN SCENE, 325 Walnut Street, Philadelphia, Pa. 19106.

© Pennsylvania Horticultural Society, 1974

in this issue

- 1 Editorial *by Jean Byrne*
- 2 Rescue *by Janet Oliver Gyer*
- 8 Closing the Generation Gap in a Food-for-the-Year Garden
by David G. Boorse
- 14 Cacti without Sunshine *by Henry F. Lee*
- 19 Digging for Information *by Ed Lindemann*
- 20 The Long and Short of Light
by M. M. Brubaker
- 22 Cooperating in the Greenhouse
by Emma Matheson Roe
- 26 The Tyler Arboretum: *Colchicum*—The Potent Flower
by Gertrude S. Wister
- 28 The Morris Arboretum: Autumn Begins with *Nyssa sylvatica*
by Ellen V. P. Wells
- 30 Books and the Green World: Plant Explorers and Their Books
by Elizabeth C. Hall
- 32 Growing Interests
- 33 Classified Advertising

Front
Cover:

Pond construction on the farm of Charles Mihlebach, Jessup Mill Road, Clarksboro, New Jersey. From this site rescuers took: meadow fringe orchid, cinammon fern, royal fern, jack-in-the-pulpit and *Viola blanda*. See page 2 for story.

Front cover photo by John Gyer

Back cover photo by Carole Bell



the way we were; the way we will be

The Green Scene is two years old this September.

We came into being because the Society felt a need for a magazine to deal with the specific horticultural problems that people in the Delaware Valley area must confront. Devoting one-fourth or one-sixth of a national magazine to our local horticultural problems simply did not satisfy the curiosity of the people who wanted to know *what, when, how, why* and *who* about the Delaware Valley.

In spite of *The Green Scene's* youth, we have already begun to change. We've added eight pages, and we've gone to a color cover. We've continued to deal with local growing problems, to provide information about local institutions, and to give a picture of the specific viewpoints area horticulturists have toward their profession or avocation.

Community needs have been twice represented in cover stories. The Gateways article stressed the need to establish a nursery in a highly polluted area to determine which trees and shrubs can successfully survive urban stresses. And our cover story picturing the lonely runner on the Fairmount Park plateau was a plea for support of the program to plant 10,000 badly needed trees in 34 of our city parks.

For the individual horticulturists, we continue to look for the offbeat story with universal appeal. Readership surveys show that people are often attracted to the exotic rather than the commonplace; in health, for example, they'd rather read about leukemia than the common cold. It's been true of horticulture as well. People have often indicated that they want to read about the one out-of-zone plant that survives here more than they want to read about the sycamore on their front lawn. One such upcoming story is the cultivation of nandina in this area. And we have a story scheduled about a radical and, we hope, controversial approach to lawns.

In-depth treatment of pruning has been our most successful editorial attempt to date; we are now planning several single subject issues. We are considering that approach to such subjects as soil and propagation.

When we were coming into being, the most frequently asked question was "Will you be able to fill the magazine?" The answer was "Heavens, yes!" And with our two year old perspective, we must say, "We haven't yet begun to scratch the surface."

We've had lots of feedback from people about what they like and what they don't like. We enjoy the pat on the back, but it's comments like "You're wrong about crape myrtle, it is hardy in this area," or "Get your nomenclature straight," that tell us people really are reading those articles and taking them quite seriously.

We briefly considered doing a readership survey but finally concluded that it would be a waste of time and money. Our readers are talking with us. You are our editorial board. If you don't see what you want, all you have to do is ask.

Jean Byrne

rescue

THE AIM IS RESCUE, NOT JUST REMOVAL



The springs ran clear between steep banks clouded with pink-white laurel in full bloom in the woods. The area had the serenity of the shrine gardens I have visited in Japan. People had walked there for years, and children had built "secret" lean-tos. Occasionally cyclists cornered the edges from the mossy banks, but the naturally contoured trails were uncluttered. It was a natural park of oak, beech, laurel, azalea, moss and the beautiful low wildflowers of acid woodlands—partridge berry, arbutus, lady slipper, pipsissewa.

A sign appeared, followed by great yellow earth movers. The laurel woods had been sold along with the adjoining meadow where a shopping center was to be constructed. I talked with the real estate agent, landowner, developer's representative, planner-surveyor, and realized that there were many reasons for the land to be used "some-time." But couldn't resources be saved, couldn't some of its wealth of wild plant material be transferred to gardens where it could grow and from which it could be propagated?

I'm not sure the developer would have welcomed us quite so readily if I had not assured him of his freedom from liability.

On my first visit to a real estate agent I learned that cooperation abounds when a project can be useful to the public and the developer. When I expressed my concern for the laurel

woods, the agent assured me that his profession isn't made up of ogres rushing to destroy the last vestige of our natural heritage. In fact, he would welcome a visit from interested local people at another site he was planning in order to assess the natural plantings and help save the best of the natural landscaping.

I needed to find a group of interested local people, so I presented a slide show to the County Nature Club, setting forth the problem. In addition to my own slides, I drew from the fine selection of wildflower slides on file in the PHS Library. Those interested in the program were invited to a picnic in the woods during laurel bloom. The owner was not free to join us, so we sent him some of our suggestions for saving at least a portion of the woods. Then our group dispersed for the summer. Word came of the New Jersey ban on open burning set for January 1973; "sometime" became a rush to clear all the land before the end of the year. The developer had listened to us courteously, but now he told us we should hurry to remove any souvenirs we wanted before the laurel woods was posted against trespassing. Hastily organized trips did rescue plants, but not enough. One hundred and fifty acres were bulldozed and burned.

From this effort we have some successes. Tiny laurel seedlings safely lifted to their new homes in their moss nurseries have doubled in growth in one year, and we did not lose a single seedling. It is now time to share them with fellow gardeners as donations to a plant society sale. Moss is now high

continued



by Janet Oliver Gyer

Janet Gyer is a learn-by-doing gardener who works with her husband John to reclaim a woodland and meadow site, removing wild grapes and reinstating wildflowers. The Gyers are actively working with the American Rock Garden Society, drawn to it by its generous sharing of gardening skills, plants and seeds.

At right:
Bill Patten digs deep to rescue a lady slipper orchid because the roots must not be disturbed.

photo: Carole Bell

drawings by Julie Baxendell







on my "want list" for rescued material. How happily woods' plants nestle in the smoother mosses, drawing moisture and sustenance from their protector. Even arbutus cuttings manage to thrive in a moss nursery. Partridge berry fortunately found its way to a group of Girl Scouts building terrariums just before the woods was destroyed in November. And the bits and pieces of partridge berry broken from the larger plaques weren't wasted. I placed them in a flat of sand and peat moss covered with their own plastic bag "greenhouse" where they obligingly rooted at every node.

Recently, we have had other successes with cuttings of difficult to transplant material. Our groups of interested gardeners are branching out from rescuing plants to rescuing endangered species by means of cuttings. Again, we've had a positive response to a positive suggestion. Very often permission will be granted by park or public garden officials after a personal visit and assurance that proper cutting collection methods are to be used. The result is access to heretofore off-limits materials.

Collecting seeds is fun because it encourages new gardeners to really look at their plants, and that is the secret of gardening success—really looking. Sharing seeds with other gardeners makes it possible to insure pockets of bloom in our backyards, if not in our fast disappearing back lots. What a thrill this year to find the tiny strawberry-like arbutus seed pods before the ants did! We'll be able to share the seeds with gardeners far from the laurel woods.

In New Jersey the Pine Barrens Conservationists work with road crews advising them of the best dates for cutting along the roadsides in order to allow full seed production of roadside

flowers. A good rescue project for a garden club, or even an individual, would be to chart seed maturing dates to protect roadside bloom, and to interest the local Highway Commissioner in the project.

Now that I am acquainted with a number of groups interested in wildflower rescue, I can plan a trip whenever plants are in danger of destruction. As for the time to move plants, the late Doretta Klaber wrote in *Rock Garden Plants* that she did not transplant in winter or when there was a long dry spell in summer. She found August to November a good transplanting season and assured us that plants can be moved in spring when they are at the height of their powers. I wish I'd paid attention to her because the lady slippers were in bloom when I first visited the laurel woods. At that time I thought that clearing was years away and I could wait until very early the next spring to transplant them. We went back to the woods toward the end of the lady slipper blooming cycle to pollinate them, a project we pursue with our own plants. Agricultural practices and gypsy moth sprays often destroy the bees that pollinate native orchids and it is a fascinating and good service to help their propagation along. It is a simple matter to pollinate lady slipper orchids; the pollen is the yellow, waxy sac at the slipper opening, one on each side. Take a small stick and transfer the pollen sac from one flower and attach it to the second flower's stigma, which is located just under the lip. In our patch we were not getting many seed pods until we artificially crossed the blossoms. Now four out of five set seed. We went back in the summer to show friends our hidden woodland and found that 10 out of the 15 plants in one patch had set seed. When in November I saw that the ladyslippers were soon going to be bulldozed, I scraped the leaves from the site, and explored on hands and knees for the plants. I was too late. They had gone into winter dormancy and all trace of them had disappeared.

The laurel woods taught me that advance planning is the key to successful wildflower rescue. There is no point in hand wringing after the construction project is approved by the Planning Board and others at the community level. I keep in touch with builders. They often subscribe to the regional editions of the *Dodge Bulletin* published by McGraw-Hill Information Systems Co., which describe bids on planned construction. Though political action is not my aim, I learned to follow local government meetings. At a recent Planning Board meeting a developer was beset by many problems. My suggestion that our group enter the property to save wildflowers before construction resulted in his writing us a letter inviting us to remove plants.

I'm not sure the developer would have welcomed us quite so readily if I had not assured him of his freedom from liability, the great bugaboo. I assured him that the rescue trip would be set for a weekend or evening when machinery would not be in operation. I planned to limit the participants to a manageable number. I promised to notify him of the date in advance and send him a copy of a release form signed by the participants. The form our Club used follows:

In consideration of the opportunity to participate in (Name of Club or Rescue Group) "wildflower rescue" I agree to hold the Club, its leaders, and property owner of the collecting site, free of any liability or responsibility for any accident or claim which may arise because of this visit.
(Signatures)
(Date)

After we received permission for the rescue trip, a scouting party composed of several of our more knowledgeable members visited the woodland to prepare a list of plants that could be rescued. This was circulated to the gardeners so that they could have their planting sites prepared before digging. We reminded them

continued

At left:

Edgar T. Wherry (Professor Emeritus of Botany, University of Pennsylvania) inspects plants on a rescue trip at Medford, N.J. On the rescue trip he located *Gaylussacia baccata*, *G. dumosa* and *G. frondosa*, which he and Morris Berd planted at his Memorial Garden at the Overbrook Campus of Friends Central School from which he graduated in 1902.



that native plant material will do best if its garden habitat duplicates its natural one. Habitat requirements are set forth in several books which I took along to the rescue trip. My favorite is by our own Philadelphian, Edgar T. Wherry, Ph.D., *Wildflower Guide*, a Doubleday Nature Guide. He provides habitat and cultural information, complete with warnings against the plants that might be too coarse or invasive for a garden plot. Dr. Wherry has long championed the idea of wildflower rescue in areas subject to destruction, but he urges gardeners to provide conditions for the plants to reproduce (possibly under a gardener's help) by seeds, runners, offsets. Only in this way is a plant saved, because there is bound to be some loss in the transfer of a plant from one site to another. A good help for me in analyzing pH and other requirements is *Growing Woodland Plants* by Clarence and Eleanor G. Birdseye, a Dover reprint. The PHS Library is well stocked with books on every aspect of wildflower gardening. An outdoor research area is our nearby Bowman's Hill State Wild Flower Preserve at Washington Crossing State Park, Pennsylvania.

On the rescue date I held the rescuers captive for a reminder of how to dig a large sod, how to transfer a sod to a piece of plywood, or large tub, with a good supply of the woods' soil. A demonstration plant was dug so that root structure could be observed closely. Seeing how deep and how far the roots traveled seemed to affect the care the rescuers took in their chore. And it is a chore. Until you have hauled a heavy plant through rough woodland you don't realize how

simple it is to just go buy a plant. And that is just as well, because rescuers are more apt to abide by a limit of a few plants of each type available. Better to take a few, plant them properly, and then organize another group trip than to take many and have them die for lack of care. For wildflowers the secret is not the soil, it is drainage. Most wild plants are accustomed to the accumulated woods' duff, which provides for them the best compost of all. But excellent compost can be made from common garden waste. The neatly bagged leaves and grass clippings on every suburban street make perfect fertilizer for our native plants.

Very often permission will be granted by park or public garden officials after a personal visit and assurance that proper cutting collection methods are to be used. The result is access to heretofore off-limits materials.

Difficulties exist in arranging entry onto private property to remove plants, but when I have reached the right people with a personal visit there has been only cooperation. Here are suggestions I think will help:

1. Leads come from chance conversations, so talk to people whenever you have an opportunity about the possibilities for wildflower rescue.
2. Obtain permission from an authority (state, municipality, landowner, builder).
3. Work with environmentalists, nature club, garden club, scout, school or church group.
4. Set a definite date for a wildflower rescue trip. Explain that bootleg trips could endanger the project.
5. Avoid large-scale publicity; it draws too many people.

6. Arrange rescue hours to fit people's busy schedules. A field trip need not take a whole day. Often a group can be assembled at 6 p.m. at a rescue site to dig until 7:30 or 8, then enjoy a picnic supper at a participant's home.

7. Prepare a handout covering plant material to be obtained and suggestions for maintaining it.

8. Advise participants to bring equipment such as: shovel, axe, pruning shears, plywood (to put under plants when carrying), burlap (to wrap roots), plastic bags for small plants, cooler and ice to protect small plants from car heat, leaf bags for large plants and to hold soil to reproduce habitat in new area.

9. Return an attendance list to the permission-granting authority (release form).

10. Publish reports in the club bulletin one year later on the success of transplants and the methods used to share them with others, reminding the participants that the aim is rescue, not just removal.

11. Then—share in my feeling of enjoyment in the bloom of the penstemon which came five years ago from the site of a gas station, the wild geranium from the road scrapers work on a shoulder being widened four years ago, the bog orchid from the site of a farm pond a neighbor built three years ago, and the wealth of new plants we are learning to care for and to share.





photo: Carole Bell

photo: John Gyer



Upper left:
Raymond Sobotka of Seattle helps his hosts Mr. and Mrs. Floyd Fitts, of Kennett Square, to carry rescued trailing arbutus, wild orchids (*Cypripedium acaule*), hudsonia and a variety of ferns to the car. Rescuers at the Medford Lake site shared the materials. Mrs. Fitts reports that some of the rescued plants were transplanted to shady parts of their garden and in the greenhouse and that the plants are still thriving nearly a year later.

Lower left:
Arbutus is moved, moss bed and all, to a north-facing slope.

At right:
John Gyer packs rescued plants into his van to transport through sand roads. They will be subsequently transferred into the more citified vehicles of other plant rescuers.




photo: Carole Bell



CLOSING THE GENERATION GAP IN A FOOD-FOR-THE-YEAR GARDEN

Three generations work together to achieve a successful harvest. Their results inspire a new goal for the Boorse family—fresh vegetables year-round.



 by David G. Boorse

David Boorse has been teaching biology and science at the Delaware County Christian School for 14 years. He was involved in the formation of the Summer Garden Workshop, which he directed for eight years for PHS and the Morris Arboretum. Here, each summer, young people were taught the basics of gardening and related arts. In the summer of '74 Boorse returned to college to work on a Ph.D. in biology education. "That too is a family project," he reports.

Anna, the five-year-old, gathers marigolds for the dinner table. The author overcomes his skepticism and tries out the rototiller, while Mark runs off to replenish his supply of manure water.

photos by Edmund B. Gilchrist, Jr.

The ecology phenomenon, which reached full steam around 1969, is taking some new and interesting turns. Collecting beer cans seems to have lost its fascination. Indeed I see more, not less, trash on the highways nowadays. In 1970 my students wanted electives in ecology, but in 1974 they are asking for electives in vegetable gardening. I even had a small group of parents come to school one afternoon a week this past spring to work in the greenhouse, start seeds, run soil tests, and discuss garden problems.

Of course, gardening is as old as civilization. When man could stay in one place and grow his food instead of roaming constantly in search of food, civilization began. Over the centuries, the importance of gardening has varied

according to economics and life styles. I have a dim picture in my memory of myself aged three or four walking by my father as he dug potatoes in his Depression garden. I remember more vividly the Victory Gardens we grew during World War II. Burpee distributed catalogs to school children and we could buy most of the seeds listed there in special tiny packets for one to three pennies. I was in 5th or 6th grade when I had my first garden. After the War, times were more prosperous and the supermarket replaced the garden in our family. Then I got married and we started a small vegetable garden.

When we were married we bought a rundown, vacant and vandalized two-and-a-quarter century old farmhouse

continued

and began to repair it. The pressure of trying to make it livable prevented us from planting more than a small plot about 30 ft. by 30 ft. Finally, three years ago we decided to make a list of the possible ways we could try to be self-sufficient on our five acres. The first thing on the list was food and we decided to start there. The 30 ft. by 30 ft. plot was planted early in the spring with onions and peas, and since it was the only plot in reasonably good condition for root crops, beets and carrots were planted in June after the peas were harvested. Then began the assault upon the disaster area. An area 60 ft. by 100 ft. that once was wild with brambles was cleared to install a septic system. Instead of the reasonably good soil that had been there, the bulldozer left 4 to 8 in. of shaley sub-soil over everything. We filled foot-deep holes with compost and planted tomatoes, squash, or peppers. Since a hoe could not make a dent in the hardened soil, the furrow for the beans had to be made with a pickaxe. The 6-in. deep furrow was filled with compost and beans planted in it. Potatoes could

I thought white beets were some new mutation until I read a copy of a 17th century *Herbal* by Gerard and discovered that he described white beets more than 300 years ago.

not possibly grow in the soil so we planted them on the ground, covered them with compost, and mulched everything with leaves. At the end of the summer we had a good harvest of beans, tomatoes, squash, peppers, and a fair return of potatoes. Considering that we planted shriveled-up, sprouted potatoes that normally would have been thrown onto the compost heap, any harvest at all should be considered good.



The corn may only be as tall as Gwen Boorse's eye, but it hides 9-year-old Dorothy almost completely. You'll find her to the left at approximately 10 o'clock.



Dorothy dries white beans on a screen.

We were pleased with our harvest but thought that it would be fun the following year to see if we could grow enough vegetables to last from the end of the growing season until the beginning of the next growing season. Our enough-food-for-a-year garden began to seem more likely when my parents retired and moved their mobile home onto our property. Dad has a knack for gardening and once he was settled he bought a rototiller and began. I must say I was skeptical about the rototiller or anything else that runs on gasoline.

I find it dreadfully demoralizing to have to spend two or three hours trying to get a lawnmower started to do a job that takes only 15 minutes, especially when Burger Queen and Mac, our lambs, can do a better job with less fuss. The rototiller worked. We cut down brambles, sumac, and black walnut seedlings on an area about 50 ft. by 70 ft. Dad rototilled it and it worked into a good loose soil.

At this time our four children discovered that they were part of the family gardening team. Anna, not yet

5, was given an area 10 ft. by 10 ft. in which she planted some lima beans and some marigold and tomato plants. Lima beans were chosen for Anna because they were the largest seeds we had. The others had plots 10 ft. by 20 ft. Samuel, age 7, planted lettuce, marigolds, tomatoes, and beets. Dorothy, age 9, had saved seeds from a Jack 'O Lantern pumpkin the previous fall and planted them in her garden. She learned how large a plant can come from a single seed and in doing so supplied us with pumpkins that lasted through the

continued

Three generations enjoy the fruit of their summer's labor at dinner. The equipment in the foreground was tentatively welcomed at first, but is now a valued labor-saving device in the Boorse family.



winter. She also learned about competition between carrots and squash that are planted too close. Mark, 11 years old, planted turnips, lettuce, carrots, and several kinds of flowers. He enjoyed working with his grandfather and learning to rototill and to drive a small garden tractor.

If a person is thinking economically and counts the dollar value of his time he would be better off at the supermarket. However, a person who plays golf usually does not reckon his per hour worth into the cost of a game.

One advantage of a supermarket is the great variety that is available, so we decided to try to get as much variety as possible in our garden. We planted yellow tomatoes and the large Italian tomatoes as well as the more common Big Boy and Beef Steak. We tried kidney, marrow fat, and soy beans for drying, yellow and orange peppers as well as the sweet red and green peppers, and white beets as well as red beets. I thought white beets were some new mutation until I read a copy of a 17th century *Herbal* by Gerard and discovered that he described white beets more than 300 years ago. Other new vegetables in our garden were sweet potatoes, Brussels sprouts, fennel and celery. All of these did very well except for the sweet potatoes, which had been severely grazed by groundhogs.

In planting we followed a few principles and tried to be as flexible as possible. The tomatoes were located first in order to give them the most sunlight and to keep them as far from the walnuts as possible. Walnut trees give off a chemical, juglone, which is poisonous to tomatoes. The root crops were planted where the soil was least stony. Members of the same plant family were kept together to facilitate treatment; for example, cabbages and Brussels sprouts are affected by the same insects and could thus be dealt with

simultaneously.

A friend who has horses and sheep gave us as much manure as we could use. Dad got a 55-gallon drum, filled it about one-third full of manure and then filled it with water. We used this to water the plants, paying particular attention to the squash and melons, which are heavy feeders. As far as garden pests go, we encouraged natural controls such as lady bugs and praying mantis, as well as the many birds that live in the thickets around the garden. The potato bugs and bean beetles were collected by hand and destroyed. The best way to get rid of groundhogs is to put them in a meat loaf. We tried frying the first one but it was too tough! As for purslane, shepherd's purse, lamb's quarters, pigweed and poke, the best method is freezing, a la Euell Gibbons.

At the end of the harvest season we took stock and found that two freezers had been filled with vegetables and two cupboards had been filled with canned

stewed tomatoes, ketchup, vegetable juice, pickles, chili sauce, pepper relish, about three gallons of dried beans and some dried corn, and assorted dried herbs. We also picked wild strawberries, sour cherries, red and black raspberries, blackberries, and mulberries to make more than 100 jars of jelly, jam, and marmalade. The marmalade was made from the fruit of our own tub-grown lemon tree.

There was more than enough to last a year so we were satisfied that our gardening season had been successful. Now, we have some new goals. One is to preserve food by other means than freezing. Another is to extend the growing season in both directions to see if we can harvest all year long. Dad has already made a cold frame and harvested radishes, lettuce, and cress before the end of April. On New Year's Day, 1974, our family harvested Brussels sprouts that had survived the few mild freezes. Both of these things encourage us to try to make the beginning of one





The family cultivates, weeds and harvests simultaneously.

harvest season meet the end of the previous harvest season. Another interesting thing we did was to make maple syrup. Several of my students wanted to know how to make maple syrup. I didn't know but was willing to learn, so on the first weekend in March two students came up and helped tap our trees (*Acer platanoides*, *A. rubrum*, and *A. negundo*), collect sap, and boil it down. Two quarts of syrup is not bad for a first try.

Is it really worth it? It depends on your reckoning. If a person is thinking economically and counts the dollar value of his time he would be better off at the supermarket. However, a person who plays golf usually does not reckon his per hour worth into the cost of a game. The same may be said of hobbies and entertainment. In the summer, our work is gardening. Our exercise is gar-

dening. Our hobby is gardening. We started out by attempting to be self-sufficient and encountered an interesting paradox. The more self-sufficient we try to be, the more aware we are of our dependency on others. To can, we had to have jars and were at the mercy of the jar shortage. We finally got some jars from a friend who was giving up canning due to poor health. The faculty at school saved non-returnable soft drink bottles for us for bottling ketchup and vegetable juice. In family devotions we prayed for a good harvest, but before harvest was complete we were praying for enough strength to get the job done. It reminded me of a song I used to hear on the radio during World War II: "Praise the Lord and Pass the Ammunition." We know the Lord would give us our daily bread. It was just that the word "give" in the com-

mon English translation was a little misleading!

I have no way of knowing at this time what significant images have been made in the minds of our children by their experiences in gardening. They certainly have been exposed to the middle-class work ethic. The country life is a good life, but Gwen and I are both teachers by profession and we enjoy it. Besides that we teach at the same school and in a few years will have the privilege of teaching our own children. An image that made an impression on my mind came last fall while I was cruising in our old limousine, nee taxi, along the 202 expressway on the way to school in the morning rush—Gwen by my side working on lesson plans and the children in the back seat shelling dried soy beans! Perhaps *this* is the best of both worlds.

CACTI WITHOUT SUNSHINE

Growing cacti from seed, under lights, is a horticultural challenge. But the effort is rewarded with unique plants.



Mammillaria grown from seed (group is two to three years old). Back row: left to right, *M. plumosa*, *Dolichothele longimamma*, *M. ocotillensis*, *M. spinosissima*. Middle row: *M. campotricha*, two *M. longiflora* in flower and *M. durispina*. Front row: *M. aureilana*, *M. candida*, *M. elongata*, *M. hahniana*.

Healthy cacti with no sunlight? Other desert succulents in bloom with no daylight? Mature plants from seed in a cellar? It is all possible now.

Desert plants with their marvelous structural and physiologic adaptations to extremely hostile environments have a fascination for plant lovers. Also, while many are simple to grow, there are those that represent real challenge to the hobbyist.

Many people have never seen cacti at their best. Unless well grown, the great beauty of form and flower is large-

ly missing. Dusty, dried out, shriveled plants in stores give little indication of what they can be. That they can survive under adverse conditions is true but their real beauty is seen only when they get adequate food, water and light.

All plants need heat, water, air, nutrients and light in varying degrees. The green thumb is really the art and science of balancing these factors to produce healthy plants in garden or home.

Most cacti and other succulents need a great deal of light. Therefore growing them well in cold, wet climates

has not always been successful. For people who do not have greenhouses or who live where there is a great deal of cloud cover, the biggest problem is to obtain sufficient light. Some varieties can be maintained on windowsills or sunporches with some success and may even be brought to flower there. Many others do not thrive under such conditions.

The coming of fluorescent tubes with phosphors, developed to produce light in the wavelengths needed by plants for healthy growth and flower-



by Henry F. Lee

Henry F. Lee, M.D., a busy practitioner of pediatrics and an associate professor of pediatrics at the University of Pennsylvania, believes that hobbies keep people in balance. One of his, the study and culture of desert plants, is the subject of this article.

At left:
View of part of cellar nursery.

Below:
Various stapelia, six months to two years old. Note *Tavaresia grandiflora*, center back row, which bloomed at 18 months.

ing, has made possible the culture of even the rarest and more difficult varieties with no sunlight at all.

Cacti and succulents in all their geometric beauty, in all their rich color of body and spine and flower can now be grown in attic, cellar, empty room or, to a limited extent, right in the living room. The ultimate challenge of growing from seed to maturity can be met with no source of light but horticultural fluorescent tubes.

Several brands of such lights are available. Growers are succeeding with all of them. My own experience is confined to Sylvania Gro-lux tubes in both the standard and wide-spectrum types. Some of my fixtures take 20 watt 24-in. tubes and others use the 40 watt 48-in. size. Results have been good with both types but the wide-spectrum tubes cost much less and are gradually replacing all my standard tubes. I assembled my reflector units from Sears Roebuck kits. Complete fixtures or kits can be obtained from many electrical

supply houses. Two- or four-tube fixtures should be used and should positively be of a reflector type. They are hung from the ceiling on adjustable cords so that height above tables is easily changed. For seed growing my usual tube-to-surface distance is 18 in.*

Lighting tubes do deteriorate slowly in output after several months and should be replaced. Date them when installed. All tubes should be wiped off with a slightly damp cloth at least every three months. An imperceptible layer of dust significantly reduces light output especially at the shorter wavelengths. Tubes near any area where cooking is done should be wiped with a soft cloth moistened with alcohol or acetone as a greasy film particularly absorbs shorter rays. I learned this well while doing bacteriologic research some years ago.

growing from seed under fluorescent lights

A warm place is needed for starting

seed. For my own purposes, since I expected to produce in some quantity, I built a small wallboard cellar room of 8 ft. by 12 ft. that encloses half of our hot air furnace. A register with manual control flaps was cut into the hot air bonnet and gives temperatures of 75° to 85° while the rest of the cellar remains at about 55° to 60° through the cold months. In this small room are two large tables built of planks over sawhorses. The tables are approximately 8 ft. by 4 ft. Four of the 48-in. double tube fixtures plus two double 24-in. fixtures give a total lighted area of approximately 60 sq. ft. An automatic timer turns them on in the morning and off at night for a total light-time of 16 hours. In the warm months when the furnace is not needed a small electric heater with thermostat keeps the temperature at 70° to 74°, which is adequate for seed sown earlier in the year.

Some succulent seed is like fine dust, while a few large cacti have seeds half the size of peppercorns. Locked in these tiny cases are the images of horse-crippler spines or the softest satiny pale green skins, or, yet again, light-transparent windows that will permit photosynthesis underground. Depending on variety, germination may take 36 hours to 60 days—so fast or so slowly do the wheels of Nature's chemistries turn!

Seed may be sown at any time of year though some insist that spring is
continued



*Sylvania now lists 19 different sizes and types of tubes from 8 watts and 12 in. to 215 watt Very High Output at 96 in. long. The Very High Output tubes require special transformers and fixtures. Commercially they may be valuable but are not needed in the home.

best. With reliable seed sources I get good germination at any time of year.

My soil mixture is quite standard. One part coarse builder's sand, one part garden soil and $\frac{1}{2}$ part sifted leaf mold plus a teaspoon of finely ground bone meal per quart of mix. Also satisfactory is two parts sand and one part commercial African violet mix plus the bone meal. The mixture is sterilized in the oven at 250° for one hour. Everything that touches this soil should be sterilized. Cactus seedlings are very sensitive to damping off. New plastic pots can be considered sterile if fresh from a carton. Otherwise, spray with a fungicide. I use the safe and time-proved Chinosol (potassium hydroxyquinoline sulfate). It will not harm the most delicate seedlings. If it's hard to obtain, no doubt other fungicides can be used.

I begin by filling new square plastic pots, 2 in. by 2 in., with the mix to within $\frac{1}{8}$ in. of the top and tap to settle the soil. I then spread a very thin layer of sterilized sand over the top—only two or three sand grains thick. Fine types of seed are thinly spread over the surface by tapping from a sterile spoon. Tap the pots again to settle the seed. Larger seeds can be scattered and then layered over thinly with sand or planted singly with tweezers. Now stand the pots in water that has been boiled until the surface is just wet. Thereafter, place them in clear plastic shoe boxes or the larger sweater boxes that can be bought at Woolworths or other department stores. Be sure to get those with clear, not opaque, tops. The sweater boxes will hold 42 of the little pots. Set the loose-fitting lids on and place the boxes in the warm room under the lights where they will stay for weeks or months until the seedlings are large enough for transplanting.

Counter any sign of surface mold or fungus with Chinosol as a fine spray, $\frac{1}{2}$ teaspoon to a pint of water. It is seldom necessary.

With this setup no water is required for two or three weeks or longer. When the surface of the soil begins to appear



Henry Lee plants fine seed by tapping from a spoon.

dry or to shrink, I add a little water containing a soluble house plant food at $\frac{1}{5}$ strength by pouring directly into the plastic boxes. In this way top watering is avoided, tiny plants are undisturbed and roots are drawn down. Top watering should be avoided until seedlings are fingernail size and that may be a year or more. Cacti go through a slow stage when they are putting down roots and then suddenly take off and grow faster. When big enough to transplant—say dime size or, if columnar types, about $\frac{3}{4}$ to 1 in. tall—they are moved to plastic thimble pots or separate 2 in. by 2 in. pots depending on how they are to be grown on or sold. Then, as soon as growth is re-established they are moved to the cooler part of the cellar on large tables with similar lighting. Placing the small pots in shallow trays simplifies watering. Many restaurants or cafeterias have slightly damaged fiberglass or plastic trays, which they discard. That's where

I've gotten all of mine.

The above technique works very well with most of the South African desert succulents as well as with cacti. That surprises many people and surprised me too when I first tried lithops, dinteranthus, cheiridopsis, pleiospilos, titanopsis and others. Who would expect their minute seedlings to thrive in the humid confines of a plastic box? But they do. Later, of course, they must be brought out of the boxes and hardened off. As they grow older they require lights at 12 in. to 14 in. if they are to have compact shapes and good color and they need less and less water as they mature. But do not be misled—they always do best with some moisture. Drowning has killed many desert plants in cultivation but absolute drought will do the same if given some time. Always remember that they can live under real desert conditions but they do better in more moderate arrangements.



Cacti in thimble and 2 in. x 2 in. pots, age 1 to 2½ years.

problems with light

All the cacti that I have tried seem to germinate well in the boxes but not all do equally well as seedlings under Gro-lux. The fault is most likely mine. It took awhile to discover that gymnocalyciums, for instance, need to be at the outer edges of the field of light or else under a fixture that is at least 30 in. above them. Too much light, as well as too little, is harmful to some varieties. I have had good success with many kinds of mammillarias, *Dolichothele longimamma*, various notocacti, *Echinocactus grusoni*, *Setiechinopsis mirabilis*, various ferocacti, some gymnocalyciums and many others. At the end of this article I have listed some of the varieties that have grown well from seed for me. Those with asterisk have bloomed.

If a large number of seeds of a single kind is to be sown, the small pots are not needed and the soil mix is placed right in the big plastic boxes. In this

case be sure to make a dozen or more drainage holes in the bottoms.

I do not recommend mixed seed except, perhaps, for a first trial. Invariably the faster and stronger growing types outgrow the weaker and you will be likely to end up with only one or two varieties.

Plants purchased from 2 in. on up almost always do well under the lights. There are a few paradoxes. Heavily spined varieties from the hottest desert environments invariably do well and keep their compact form and splendid spine structure while some "softer" varieties that are usually considered of easy culture may tend to grow thin and less solidly. In this group are lobivia, mediolobivia, rebutia, some parodias, droya, tephrocactus and a few others. These seem to need more intense light and carefully controlled watering despite the fact that some of them come from less rigorous environments. Since I do not have a greenhouse I have no

way of knowing how much better I might have done under glass.

If you are new to raising these plants you may be at a loss as to what varieties to try. Naturally you want to end up with goodlooking specimens and the possibility of flowers. In any plant family numbering thousands of kinds there are bound to be some tramps and derelicts—unattractive characters with poor eye appeal. I've heard someone say, "Cacti are such ratty, straggly looking things!" This is true of some varieties, especially in habitat. However, that person probably has not seen the really beautiful types in cultivation.

Even one good book can be immensely helpful to you in selecting what you want to sow or buy. Any issue of the *Cactus and Succulent Journal* will lead you to a number of nurseries and fine plants. Avoid cheap "Special Offers." In general they will get you unattractive material in poor condition and possibly some unwanted

continued



Seedling pots in sweater box.

pests. The latter, by the way, are no problem in seed grown plants in properly prepared soil.

At the present time there seems to be, in urban and suburban areas, an almost insatiable demand for well grown small cacti and succulents. If you can grow good plants to a size that looks right in a 2 in. by 2 in. pot you will find a ready market. Some florists, garden supply stores or hobby shops may buy your plants. Be sure to take them good material. No one wants to buy weak or sickly plants. Throw them out! Take your best and you may find, as I have, that while a true profit escapes you the sales you make will buy your fixtures and help to light them.

If you are a hurry-up gardener cacti and succulents may not be your thing—at least not from seed. A diameter of an inch a year is exceptional and only a few varieties reach blooming size in less than three or four years under the best of conditions. Some take much longer. The columnar types like the Old Man, *Cephalocereus senilis*, or the Silver Torch, *Cleistocactus strausi*, bloom only with maturity and at considerable age. But the plants themselves are of great interest and beauty.

On the other hand, you won't need a "cactus sitter" if you are away for a week or two. Young plants like attention but can do without it for considerable periods. Then, too, they give you plenty of time for other gardening interests. For people whose hobby time is limited they offer a rich return for minimal input. When your first plants from seed begin to bloom you will feel a real satisfaction. Your neighbors will claim that you are lucky and were born with a green thumb. Only you will know better.

selected list of choice plants grown from seed

Cacti

*Astrophytum asterias**
Astrophytum myriostigma
Cephalocereus senilis
Cereus peruvianus monstrosus
Dolichothele longimamma
Echinocactus grusoni
Echinocereus (many species)*
 (beautiful long-lasting flowers)
Stenocactus species
Ferocactus acanthodes, *F. nobilis*,
F. covillei
*Gymnocalycium mihanovici friedericki**
 (one of best bloomers of all)
Gymnocalycium (several others)*
Leuchtenbergia principis
Lobivia (several)*
Mammillaria longiflora, * *M. elongata*, *
M. pyrrhocephala, * *M. nivosa*, *
M. zuccariniana, * *M. guelzowiana*,
M. insularis, * *M. geminispinosa*,
M. bocasana, * *M. klissingiana*,
*M. bombycina**
Cleistocactus strausi
Notocactus haselbergi, * *N. magnificus*,
*N. crassigibbus** (flowers lasting)
*Parodia aureispina**
*Setiechinopsis mirabilis**
 And many more

Other succulents

Argyroderma (several)
Cheiridopsis (several)
*Dinteranthus puberulus** (germinate
 in dark)
*Faucaria** (many species)
*Lithops** (many species)
Lapidaria margaretae
*Odontophorus**
*Schwantesia**
Titanopsis calcarea
*Stapelia** (many species)
Hoodia gordonii
*Huernia** (many species)
*Taveresia grandiflora**
 Aloes, many (mixed seed starts well
 in sphagnum)

*Successful flowering under lights

recommended books

Cacti and Succulents, A Practical Handbook

by Walter Haage (about \$12.50)
 Beautifully illustrated

Pocket Encyclopedia of Cacti in Colour
 by Edgar and Brian Lamb (about \$5.00)

Both are available along with many others
 from: Abbey Garden Press
 1593 Los Canoas Road
 Santa Barbara, Calif. 93105

Ask for their publication list.

highly recommended

For seeds:

New Mexico Cactus Research
 P.O. Box 787
 Belen, New Mexico 87002

Send 50¢ for accurate seed list of over
 2,000 varieties.

For plants:

(Allow 2-3 weeks; carefully prepared
 shipments)

Abbey Garden Nursery
 Box 30331
 Santa Barbara, Calif. 93105
 (Beautiful catalog for 25¢ return postage)

Henriettas Nursery
 1345 N. Brawley
 Fresno, Calif. 93705
 (30¢ for a splendid catalog)

Kirkpatrick's
 27785 DeAnza St.
 Barstow, Calif. 92311
 (Ask for their latest list.)

Grigsby Cactus Gardens
 2354 Bella Vista Dr.
 Vista, Calif. 92083
 (50¢ for fine catalog)

september is the time to bring house plants indoors

September is the month to bring your house plants back indoors. There is no exact calendar date for this event, just use good judgment. Ideally, plants should be placed either in the house, greenhouse or sunporch before the heating system comes on. This timing will give the plants a chance to become acclimated to their new environment before the shock of being surrounded by dry heated air. Of course, all tender plants must be brought inside before the first frost.

Before bringing the plants in, be sure to examine them carefully for any insect pests, fungus or other disease problems. A good washing is in order for all plants, except cacti and succulents. A few drops of dish washing detergent added to the water will help. Groom the plants carefully, remove any damaged or discolored leaves and flowers. If pots have been sunken in the ground and you break roots when lifting, expect those plants to lose most of their leaves.

Once the plants have been placed inside, I find it advisable to mist them several times a day for the first few days. This extra humidity helps the plants to adjust to their new dry surroundings. Most of my house plants benefit from a daily misting for the rest of their indoor stay. Continue to fertilize your plants on a regular basis through the month of October.

In addition to grooming the plants, it is a good idea to clean their containers before they are brought back inside. Again, water with a few drops of detergent and a brush or sponge will do the job. It is not necessary to remove the plants from their pots.



photo by Carole Bell

digging for information

HORTICULTURAL
CORRESPONDENCE

by Ed Lindemann
horticulturist

cyclamen mite

Q. Can you please tell me what is happening to my African violet? The plant looks deformed, especially in the center. The flower does not open. I don't see any insects in the plant.

S.B., Wallingford, Pa.

A. The specimen from your African violet appears to be infected with cyclamen mite. The infested leaves on the mature plants become deformed, wrinkle and curl from the outside when this particular mite attacks the plant. Unfortunately, there is no control at this time for this particular pest. It is my suggestion that you dispose of the plant as well as any others showing the same symptoms as quickly as possible before it spreads to other plants.

mite and scale

Q. My Norfolk Island pine constantly drops its needles in the sunny hallway of my house. Please tell me what I should do.

Mrs. R.S., Gladwyne, Pa.

A. The specimen from your Norfolk Island pine shows that the plant has a slight mite and scale infestation. I suggest that you spray the plant with a combination of malathion and kelthane.

I also recommend that you check the container that the plant is growing in to make sure that the roots are not girdling the trunk of the tree. This very often happens in mature Norfolk Island pines.

scale

Q. The branches of our 12-year-old pin oak are covered with white scale. Can you identify the specific disease and tell me if it is harmful and how to get rid of it?

Mrs. R.C.M., Cherry Hill, N.J.

A. Your pin oak is infected with one of the several scale insects that attack a variety of oaks in our area. Scale attack will weaken the trees and can in some cases cause death in young trees. As with many pests that attack large trees, it is too late to do anything about it by the time the pest is recognizable in summer or autumn. Controls should usually be started in early spring. Before the buds open in the spring, spray the tree with a "Superior" miscible oil or lime sulfur. Spray with malathion in the early summer when the young scale are moving.

the long and short of light

Continuing garden experience develops a deep appreciation of the importance of light—its **intensity**, its **duration**, and its **quality**. Each of these three aspects of light has its own peculiar importance in horticulture. **Intense** sunlight is necessary for successful culture of many plants. Vegetables like corn and tomatoes will not attain full productivity unless they receive unimpaired sunlight all day. Most amateur gardeners think of fertilizer as the panacea for plant shortcomings and ills. I'm sure that dearth of bloom is more often related to deficiency in light than to any other cause (assuming the plant hasn't been chewed up by pests). Ample light exposure is often necessary for a plant's defense against fungus diseases.

It is sometimes possible, with shade tolerant plants, to substitute duration of light when more intensity is needed. This effect is used by indoor gardeners who must depend on fluorescent lights. Extending the light period to 18 hours, for example, can help a little to make up for the weak intensity of fluorescent lights. There is a limit to this practice, however, because most plants must have some dark period to thrive.

Duration of the light and dark periods influences plant life in many ways. In fact, it is difficult to understand the sensitivity of plants to a slight change in the ratio of light period to dark period. In August when

we think it is still the middle of summer and are not very conscious of a shorter day, some plants have already sensed the change and have been stimulated by some mysterious mechanism to begin to form flowers for late summer and fall bloom.

The term "short day plants" is applied to those plants that are stimulated to bloom by the shortened length of daylight. This is, however, a misnomer since length of daylight does not in this case control the flowering. It is the longer dark period that stimulates these plants to initiate flowers. Interrupting the dark period by an electric light will prevent flowering in spite of a shorter day. Obviously, a short day ordinarily necessitates a long night as long as the sun continues its 24 hour cycle.

Interruption of the dark period is a useful tool for the advanced gardener. For example, from late August to April, chrysanthemums and other short day plants concentrate all of their energy on flowering at the expense of vegetative growth. This process can easily be changed by shining an incandescent light on the plants from 10 pm to 2 am to break the dark period. Cuttings can then be rooted during the winter months, and the mums grow without that obsession to flower.

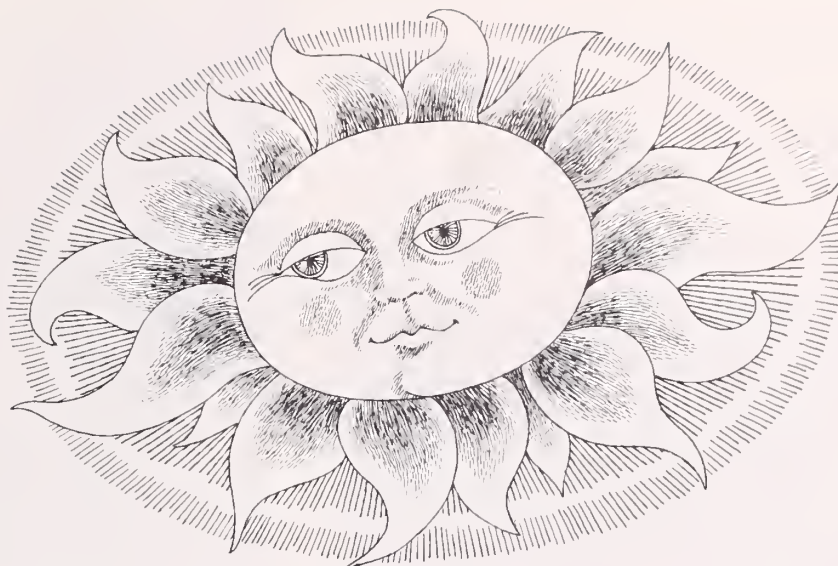
Conversely, artificially lengthening the night forces a chrysanthemum into bloom in summer, when it would normally continue vegetative growth. This is imprecisely called "shading," because it takes more than just shading.


The plants are completely covered with a black cloth, or transported into a dark room, so that all light is excluded for a period of about 12 or 13 hours. Extensive use is made commercially of both "shading" and lighting to grow and flower mums at any time of the year.

Other short day plants grown commercially are poinsettias, gardenias, kalanchoes, and Christmas flowering begonias. Fall blooming wildflowers like goldenrod and Joe-pye-weed, and many common weeds like ragweed and pigweed are also short day plants. Hay fever sufferers might wish it were possible to light up the fields and hedgerows for a few hours in the middle of the night to prevent flowering of ragweed.

Some plants are extraordinarily sensitive to a lengthening night. It takes only one long night to throw the cocklebur into the reproductive cycle. Poinsettias require more long nights to initiate their flowers, but a very weak light at night will prevent bloom. A light just a little brighter (and redder) than the full moon is sufficient. Chrysanthemums require an extended period of long nights for satisfactory flowering. In most cases where flowers are initiated by long nights, the temperature is also important, and either too low or too high a temperature will offset the long nights and delay or prevent flowering.

We should continue to marvel at



 by M. M. Brubaker

the subtle senses of plants. They distinguish for practical purposes the various spectral colors which combine to make up white light. It is the red component of light that, for plants, extends the day and shortens the night. To interrupt the night, we need just a little red light. That is why ordinary incandescent light is so effective; it contains a high proportion of red. Fluorescent light is quite ineffective in shortening the night to prevent flowering since it contains only a small proportion of red light. On the other hand, photosynthesis depends on other components of light, particularly the blue.

Just as some people enjoy the early morning in their garden and others prefer the night life, so we have short day plants and long day plants. Many that flower in summer are long day plants, like the daisies of the field and red clover. Grasses and cereal grains as well as garden vegetables like beets and radishes are long day plants. Here again the red light effect appears. When the natural day isn't quite long enough to induce flowering, you can extend the day with a comparatively weak red light to give a long day for flower initiation. There are, of course, a large number of common plants which will form flowers on either short days or long days.

The influence of red light goes far beyond the flowering of plants. Quite a few seeds require exposure to light for germination. Ageratum, begonia, impatiens, lettuce, and petunia seeds are examples, and red light stimulates

them to sprout. Dormancy of trees and shrubs is induced by long nights. A night light in the garden can delay dormancy of woody plants in late summer and fall and leave them unprepared for winter. Conversely, under greenhouse conditions, continuous growth can be obtained in a seedling tree by breaking the night with a light and preventing dormancy. Once dormancy is induced, however, it must usually run its course and be broken by an extended cold period.

Strangely enough, a chemical can be substituted for some of these red light effects. Gibberellin, the toxin of a mold discovered in Japanese rice fields, will substitute for red light in inducing germination of lettuce seeds for example. It can also be used in certain cases to break or prevent dormancy in plants. Long day plants can be induced to bloom on a short day by treatment with gibberellin, but short day plants are not so easily persuaded by chemicals.

The red light effect extends also to many animals. It controls the sex life of lizards, a number of birds and some mammals. Lengthening night triggers the mating season of owls who start their hooting as the early goldenrod begins to flower in August. The avant gardener should be as conscious of, and responsive to, light as plants are, especially in the morning as the first red glow shows in the east.

MORE LIGHT ON THE SUBJECT

Artificial sources of light can alter the activity of all organisms on the landscape. Do these alterations help or harm outdoor plants? For example, there has been much discussion about the effect of the high intensity sodium street lights. The USDA has issued a 10-page booklet, *Security Lighting and Its Impact on the Landscape*, which answers some important questions including: What is the effect of increasing the intensity of light throughout urban areas? What kinds of changes in plant growth should we expect from the new security lighting? The article also rates the light sensitivity of 18 commonly grown trees.

Request: Paper CA-NE-7 (Nov. 1973)
U.S. Department of Agriculture
Plant Genetics and Germplasm
Institute
Agricultural Environmental
Quality Institute
Beltsville, Maryland 20705

A 16-page paper, *Horticultural Lighting*, lists, among other things, the recommended light levels for 57 selected decorative plants for the indoor garden as well as illumination in footcandles at various distances from lamps normally used.

Request: *Horticultural Lighting*
L. E. Campbell/H. M. Cathey
U.S. Department of Agriculture
Beltsville, Maryland 20705

M. M. Brubaker has four greenhouses: two for orchids (one warm, one cool), one for chrysanthemums and one a low temperature greenhouse for wintering over plants. The low temperature greenhouse is plastic and the first of its kind to be built. Throughout the year in these greenhouses, Dr. Brubaker manipulates light in the ways described in his article.



by Emma Matheson Roe

"Don't look now, but aren't those slug eggs in your pots?"

"Slug eggs? That's my new time release fertilizer!"

Learning as they garden, 50 members of a cooperative greenhouse in Wilmington, Delaware, are finding that togetherness can be rewarding as well as practical. The sharing of knowledge, as well as of costs and cuttings, has expanded the horticultural horizons of each member of the four-year-old project.

The experiment in communal gardening began in 1970 when the Garden Club of Wilmington was offered the use of a large private greenhouse complex and its surrounding cutting beds. Five members of the cooperative are Garden Club members and 45 are people living in the Wilmington area who are interested in horticulture.

Thus assured of community interest, the Garden Club made a study of costs of running the houses. Old-fashioned and in need of some repairs, the two 100 ft. x 25 ft. greenhouses were structurally sound and were conveniently located in the city. The fuel bills of the past years were examined and estimates for the needed restorations were secured. The legal aspects of a joint enterprise were investigated, and a written agreement between the Garden Club and the greenhouse members was drawn stating the responsibilities of both parties. An insurance policy covers bodily injury and property damage. After the basic renovations were completed, the greenhouse was outfitted with the necessary hoses, nozzles, and gardening supplies and an automatic misting system was installed.

The first greenhouse was opened in January 1971 and proved so popular that over the summer the second one was refurbished; by the fall of that year both houses were operating. The greenhouse is open from September through May.

Financing has fluctuated and with rising costs will no doubt continue to change. The initiation fee has been \$25 and rental of individual areas for the year has run about \$100 with the option that the members of the cooperative will be assessed for the cost over-run should it be necessary. A buffer fund is held in reserve in case of major repairs, but the annual charge per person is just enough to cover expenses. Although the greenhouses are financially self-supporting from an operating and maintenance standpoint, the Garden Club has made extra funds available as needed for extra benches, storage shelves, and painting.

The cost of operating a community greenhouse is not only low; it is a downright bargain if you compare it to the cost involved in building and operating your own greenhouse. One woman who is coming into the cooperative next year found that it cost her \$90 just to maintain her own greenhouse for two months last year.

The Wilmington Garden Club members have given many hours to the project organizing workshops, opening their gardens and greenhouses and generously sharing their experiences as well as their cuttings and plants. Walter Petroll, horticultural director of Winterthur, was very helpful with advice when we were setting up the greenhouse, and he still comes by from time to time to make helpful suggestions. He helped us to find our first gardener for the weekly maintenance chores. Everett Miller, assistant director, and Lois W. Paul, education supervisor, both of Longwood Gardens, have also helped us to find qualified gardeners and have arranged for the gardeners to participate in the Longwood Garden courses.

In turn the members have opened the greenhouse at various times to school and scouting groups for tours and workshops, thus passing along their

skills and knowledge to the next generation. Other groups have made inquiries from time to time and have been welcomed to the greenhouse.

A bulletin board in the potting room posts schedules and notices and keeps the members informed of new gardening techniques. A collection of books, periodicals and catalogs circulate among the membership. Monthly educational meetings include basic techniques of propagation from seeds and cuttings, bulb forcing, hanging baskets, topiaries, pruning, drying and arranging flowers, and many field trips to other greenhouses and nurseries.

Division of labor. The members divide the administrative chores among themselves; one woman keeps the books, another schedules and supervises the watering, another obtains supplies. The education chairperson plans lectures and trips, and the secretarial and telephone committees keep the members informed of current plans, projects and problems.

A gardener from the area comes in for several hours on weekdays to open and close the vents, water, spray and mix the potting soil. I will explain later how watering is handled on weekends.

Each greenhouse member is entitled to approximately 30 sq. ft. of space. Originally the greenhouse was divided so that each person's total area was in her or his personal bench. Because of the wide variety of plants grown, it became necessary to reorganize for more efficient watering and to group similar plants together. A warm section holds seedlings, cuttings and young plants in tiny pots. It is further subdivided with a shaded section for humidity-loving orchids, and a "desert" area for succulents and cacti. Three large cold frames and a cool room are used for storage of large plants, leaving the individual bench space for her own special projects.

continued

COOPERATING IN THE



At left:
The author examines cattleya housed under a special net shading material in a warm section of the greenhouse. The problem is to figure out "which one is mine?"

Below:
The author is hidden behind the banana tree, which was moved into the warm area from the too cold storage section. Center, Vida Ruppe and, right, Marnie Laird redistributing coleus, daisies and scizanthus in the communal area.



Left to right: Marnie Laird, the author, and Vida Ruppe. Communal growing area shows flats of rooted cuttings and small pots of young plants. Succulents and cacti grow along the back wall and are watered sparingly.



photos by Edmund B. Gilchrist, Jr.

GREENHOUSE

Duane Abrams and her father, John Gill, inspect the cutting beds adjacent to the greenhouses, while Kay Mell sets out early vegetable seedlings.

Ms. Abrams and Ms. Mell used four plots for successive plantings: three of the plots are approximately 35 ft. x 35 ft. and one is 50 ft. x 70 ft. They plant a minimum of 18 vegetables. Until recently they have used marigolds to fend off some of the pests. However, this year's midsummer damage left them contemplating a spray just before we went to press. The four plots provide enough food for the 11 people in the two families.



24

Above:

Making every inch count, Vida Ruppe works at her bench. Most members grow a variety of plants; sun loving geraniums bloom on the top deck, shade tolerant plants live below.

Top right:

The author and Marnie Laird hose down the aisles to keep up the humidity. Individual benches hold ferns, begonias, ivys, geraniums and pineapples.

At right:

Out of the cold frames and into the garden. Left to right: Vida Ruppe, Marnie Laird, Kay Mell, Duane Abrams, Merideth Jenney. Many plants are wintered in the cold frames and greenhouse grown plants are hardened off here in the spring.



Standards and topiaries are very popular among the group, and geraniums give way to jasmine and gesneriads as the gardeners become more sophisticated about using their precious space. We try to plan our growing so that there is always something to take home to brighten the winter day. By spring the bulbs, which have been buried in the cold frames begin to appear, and vegetables and annuals for the summer garden are sown. The in-town members make good use of the old cutting beds that surround the greenhouse during the summer. There are approximately a dozen gardens and people make full use of them, experimenting with successive crops and organic growing methods.

Overcrowding is a major problem in the greenhouse as the enthusiastic gardener always has room for one more plant, and the temptation to take cuttings from the vast amount of material available seems to be irresistible. Many people have added second decks above their benches, growing shade lovers on their lower levels, and ferns and impatiens on the floor. Neighbors often pool their space to get just the right combination of sun and shade for their particular plant's requirements. The enthusiastic propagators in the group tend to use more than their allotted space in the communal areas, but since few members are primarily interested in storage, there seem to be remarkably few territorial disputes. Consideration is the key to success in communal gardening.

Watering. The one subject that nobody can ever agree on is watering. Half the people complain that their plants are too dry, and the rest are positive that their babies are drowning. Most plants seem to flourish in spite of, or because of, all the agonizing on the part of their owners.

When the greenhouse was started, we had a rather loose arrangement for watering. However, after all the plants and seedlings died in the April sun when a weekend waterer forgot and left town without finding a substitute, we decided that we needed to develop a failsafe method of watering.

During the week, a gardener has been hired to water and handle other chores. A rotating system has been worked out whereby each greenhouse member is assigned watering responsibilities for one or two weekends or holidays throughout the year. Marnie Laird is chairwoman of the watering committee. Before the greenhouse is opened in September, she sets up the

year's watering schedule. The weekend chore is too much for one person to handle at a time, so two people are assigned. Each member receives a copy of the year's schedule of assignments. Late in the week, an assigned person calls the people scheduled for the upcoming weekend to remind them that it is their turn to water. She goes over the instructions with them at that time. Since this system was devised, no plants have died because they weren't watered on the weekend.

The checklist of weekend responsibilities includes some of the following points:

- The greenhouse should be opened by 10 am and closed between 4 pm and 6 pm, depending on the weather.
- Do not overwater: dry soil needs attention; damp soil does not.
- The floors in all sections of the greenhouse should be watered to maintain humidity.
- Cold frame vents should be propped open when you come in and closed at night.
- Waterers are also responsible for cleaning the potting room.
- The back storage room in the coldhouse should not be watered unless plants are dry.

Marnie Laird reports that people have taken their responsibilities seriously and in one instance helped to avoid a calamity. On the first Thanksgiving after the greenhouse opened, as Mrs. Laird and her family were preparing to leave town, she received a frantic SOS from the waterer. She was told that a hail storm had blown out many of the windows. A quick telephone network pulled together many hands including greenhouse members, children, visiting grandparents and cooks who left turkeys in the ovens. Everyone helped to clear away the debris, and black polyethylene covered the frame until the glass could be replaced.

Pests. The major greenhouse pest is the ubiquitous white fly. We are experimenting but have not yet found a fully satisfactory method of controlling the pest. We have used Plant Fume 103, which worked well last year, but not too well this year. Generally, people have treated the pest problems in their own areas and when, for example, aphids are spotted the owner is asked to treat her or his plants promptly to avoid the spread of the problem. It's suggested that new plants coming into the greenhouse be dunked in malathion (or insecticide appropriate for the type

of plant). Clean pots and weed-free benches are encouraged. Good housekeeping is as important in the greenhouse as it is at home.

The energy crisis proved an unexpected blessing when the members found that the greenhouse could safely be run about 10° cooler than it had been previously, at a great saving in

The Energy Crisis proved an unexpected blessing . . .

fuel consumption. The thermometer is set to hold at a 55° temperature, which due to the idiosyncracies of the elderly heating system gives a night temperature range of 45° to 65° in various portions of the house. The sun brings it up to 70° or more during the day. Many plants did better than ever in the cooler environment, and while growth was slower, the plants seemed stronger and more disease resistant.

Vandalism has been a minor problem because of the urban location of the greenhouse. Small boys and rocks seem to have a fatal attraction for that vast expanse of glass, and repairing broken windows is a continuing maintenance problem. Plants have been known to vanish mysteriously around Christmas and Easter, and it has become necessary to keep the greenhouses locked at all times. Each member has her own key.

Although the reapportionment of the available space in the greenhouse has alleviated the watering problem, the communal areas do cause a certain amount of confusion. Despite the requirement that every pot and flat must be labeled with the owner's name, mix-ups occasionally occur. Usually the wandering plants find their way back to their owners by the end of the season. Unclaimed and unnamed "orphans," and the surplus seedlings and cuttings are given to the Delaware State Hospital for their garden therapy program when the greenhouse closes for the summer. The Garden Club of Wilmington's greenhouse project thus benefits the community as well as the eager young gardeners who are learning and growing together.

Emma Matheson Roe is a member of the Garden Club of Wilmington and of several horticultural societies. She has been active in the communal greenhouse since its beginning, and for the past two years has been chairwoman of the project.

COLCHICUM... THE POTENT



photo by author

26

During the days of early fall, visitors to the Tyler Arboretum will find some flowers in bloom that look as if they were left over from spring by mistake. There is one group, *Colchicum byzantinum*, near the Fragrant Garden at the end nearest the barn, and about a dozen kinds can be seen below Lachford Hall.

They look very much like crocuses and are often called autumn crocuses, but this is a misleading name, as some true crocuses do bloom in autumn. They are also called meadow-saffron, but the true saffron is *Crocus sativus*, source of the saffron used for flavoring, and once a precious drug. They were often called naked boys, because the flowers appear without any leaves, and another old name for them was "the son before the father," because the seed pods (from the previous autumn)

appear in spring with the leaves. Probably most gardeners in this country call them colchicums.

It is easy to distinguish colchicums from crocuses, for they have six stamens, while crocuses have only three. At flowering time, the ovaries of both genera are below the ground. From below ground level the flowers rise on long perianth tubes instead of on the stalks or stems usual in most flowers. The pollen grains must grow from the stigma down the long style to fertilize the ovules hidden below ground. As the seed ripens, the scape or stalk, so very short at flowering time, lengthens so that the seed pods are above ground.

The flowers of colchicums are somewhat larger than those of crocuses. A few species bloom in the spring, including the one yellow; the majority are autumn-flowering. The chief flower color is a light rosy purple. Some species are notable for the tessellating

or checkering of the flowers. Those that are most strongly tessellated seem less easy to grow in our area, but a checkered pattern, usually faint, can sometimes be seen on freshly-opened flowers of the kinds that thrive here.

Since they are poisonous, colchicums are not eaten by rodents, a great advantage they have over the tasty corms of crocuses. But they have a fearful disadvantage: their foliage, which is large and coarse, appears in spring and ripens off into large, untidy masses of yellow in midsummer. These masses flop over on nearby plants and should not be removed until dry.

The gardener, then, who would enjoy the charming flowers of colchicums in the fall must choose carefully the places where they are to be planted, as well as what kinds to plant. But the choice of kinds is very much limited by the very few commonly offered in this country.

Colchicum autumnale, widespread in Europe, is the easiest to get. It is hardy and free-flowering, and the usual light rosy purple of the genus. It has a white variety, and there are doubles in both purple and white, but they seem to lack the stamina of the singles.

As far as I am concerned, the first choices are *Colchicum speciosum* and its exquisite pure white variety. The flowers are tulip-shaped and large, and the white of *C. s. album* makes the white variety of *C. autumnale* look gray. A variety of *C. speciosum*, *bornmuelleri*, is valuable for its earlier bloom, sometimes in late August after a good rain. The buds are white, the color appears as the flower matures, but the base of the flower stays white. 'Violet Queen' opens flat, like a narrow-rayed star. 'The Giant' is a little more rosy than most.

These are but a few of the 60

FLOWER

species, varieties and cultivars in this genus.

Where should colchicums be planted? Those masses of leaves must be remembered. They reach as much as 20 in. in length and over 4 in. in width. At Tyler, they are planted in grass. As part of such a large area, the dying foliage can simply be disregarded. We have many at home in a large planting of pachysandra, the leaves of which supply a green base for the leafless flowers. We also have them in ferns, the tough hay-scented fern. They can also be grown in thin woodland or under small trees, where they can get sun before the tree foliage is fully grown, or in places where higher vegetation will hide them in June and July. The corms are much larger than those of crocuses, and should be covered with 4 or 5 in. of soil. With the flowers bursting to get out of the corm, early ordering and planting are essential; though if the flowers are blooming in the bag when they are received, the corms are not damaged. August and early September are the usual planting time.

Colchicums have a lurid past. They sprang from the blood of Prometheus. Prometheus wanted fire for men, but Zeus, angry at a trick played on him by Prometheus, forbade their having it. Prometheus stole some fire from the chariot of the sun, and concealed the glowing coal in a giant stalk of fennel, which he took to earth. Zeus, in a fury, ordered Prometheus chained to a pillar in the Caucasian Mountains, where a vulture tore at his liver by day. At night he was healed, to be torn the next day. At least three species of *Colchicum* grow in the Caucasian area. All through the neighboring country

there are many more. South of the Caucasus, on the eastern shore of the Black Sea, was the ancient country of Colchis, from which the word colchicum is derived. To Colchis came Jason and his Argonauts, in search of the Golden Fleece. The king promised Jason the fleece if he would yoke two fire-breathing bulls, plow a field, and sow it with serpent's teeth. Medea, the king's daughter, fell in love with Jason. Here I quote Robert Graves' book, *The Greek Myths*. "She offered him a flask of lotion, blood-red juice of the two-stalked saffron-colored Caucasian crocus, which would protect him

"She offered him a flask of lotion, blood-red juice of the two-stalked saffron-colored Caucasian crocus, which would protect him against the bulls' fiery breath; this potent flower first sprang from the blood of the tortured Prometheus."

against the bulls' fiery breath; this potent flower first sprang from the blood of the tortured Prometheus." The word saffron here refers not to the saffron dye, which is yellow, but to the color of the saffron crocus (*Crocus sativus*) which is purple.

Jason used the ointment on his body and weapons, and as we all know, yoked the bulls, sowed the teeth, and finally escaped with the fleece and Medea.

The potency of the plant is very real. The alkaloid it contains, called colchicine, was used by the Arabs in the treatment of gout and is still so used. Doses must be carefully determined because of unfavorable side effects. The poison found in all parts of *C. autumnale* was known to the ancients as dangerous. E. A. Bowles implies, in his invaluable book, *A Handbook of Crocus and Colchicum for Gardeners*, that it was the more eastern species that were used in medi-

cine, and of course these were the ones available to the Arabs.


Colchicine is one of the compounds used in plant breeding. Plant tissues are treated with it to double the chromosome number. Many plants are killed by the treatment, and many are deformed and useless.

Bowles comments on the shape of colchicum corms and the use of the plant for gout. He likens the shape of the corm to the shape of a swollen foot, and points out that here is one plant that may be said to conform to the Doctrine of Signatures, that old belief that the shapes and markings found in plants were clues to the diseases they were designed to cure. Colchicum corms are indeed oddly shaped, with protuberances that can be likened to a heel or toe.

Now to get back to the Tyler Arboretum. In front of Lachford Hall, under the big ginkgo, and near the colchicums, another crocus-like flower may be found in the fall. It is the bright yellow *Sternbergia lutea*, no relation to either crocuses or colchicums. The flower, topping a 6 to 9 in. green stem, has six stamens, and a short perianth tube. The ovary is, of course, well above ground. The slender, shining leaves appear with the flower.

Come to the Tyler Arboretum in September to see the flowers, and then wander up into the Pinetum, where you will find the dogwoods and the sour gums putting on their autumn finery. If you would like to know more about colchicums, you will find Bowles' *Handbook* in the PHS Library. For more on the mythology of plants, try Robert Graves' *The Greek Myths* and *The White Goddess* and Sir James Frazer's *The Golden Bough*.



 by Gertrude S. Wister

autumn begins with NYSSA SYLVATICA

If summer must end, let the finish be a crash of cymbals, no somnolent slipping away to lifelessness but a blazing, glorious coda to lift the heart and stir the blood. Blood is the color then, the blood red of *Nyssa sylvatica*: the tupelo, black gum, sour gum, pepperidge, or the beetlebung tree. A tree of many popular names because it is such a well-loved species.

At the Morris Arboretum fall is announced on the slope beyond the west gate of the rose garden when the early turning tupelo starts to flush in September. By mid-October the trees are in full scarlet, with a brilliance of color matched only by the swamp maples and sumacs. The Morris's tupelos are in a mixed grove of tulip poplars whose yellow autumn coloring doesn't begin until well after the tupelo has had its say. The floribundas in the rose garden, making a new burst of color in September, are overpowered by the color of their towering neighbors.

Nyssa sylvatica, one of our finest native American trees, was named rather inappropriately by the Swedish botanist Linnaeus after Nyssa, the water nymph who educated Bacchus. In wild areas, *Nyssa sylvatica* is often found along river banks, swamps or ponds which doubtless suggested the nomenclature to the classically oriented Linnaeus, but we prefer the



Nyssa sylvatica

photo by Gary Koller



MORRIS ARBORETUM

9414 Meadowbrook Ave • Phila. • PA 19118
Ch 7-5777

more indigenously American name, tupelo. That word is derived from the Creek Indian *itoopilwa*, meaning tree of the swamp. The Indian doubtless venerated it for its attractiveness, and as a food source for a rich variety of birds, including the wild turkey and the ruffed grouse. What brings them, and a myriad of robins, waxwings, vireos and catbirds besides, is a dark blue, almost black cherry-like fruit which, like the persimmon, requires a frost to be edible. Donald Wyman notes in his *Trees for American Gardens* that the tupelo's blue fruit is among those most commonly brought into the Arnold Arboretum to be identified.

Even after the leaves fall the tupelo presents a striking appearance to be appreciated throughout the winter. Its branches zigzag fantastically, like a cartoonist's drawing of lightning. The characteristic apparently makes the tupelo susceptible to wind damage, although the tupelos of the Morris Arboretum survived Hurricane Hazel in October 1954 better than other brittle species. The damage done by that storm to some of the tupelos is still apparent but they did make it through.

Some compare the *Nyssa sylvatica* to the pin oak in appearance: both have drooping lower branches that look somewhat dispirited in winter, and both are very twiggy. The nyssa has a tall, straight trunk that does not divide, and again like *Quercus palustris*, has slender, spreading branches. Nyssa is a pleasing tree in shape, symmetrical when young, with a narrow, flat-topped crown in maturity. In summer,

too, it provides excellent shade, and its lustrous, leathery leaves are of a fine, deep bright green.

I became acquainted with the tupelo on a walking trip in the Shawangunk Mountains in New York where chalk cliffs delineate deep ravines. The time was early October and the fiery red of the tupelos had yielded to the sassafras. The still brilliant forest pouring into the valleys was scored by the silvery, twisted arms, now bare, of a multitude of tupelos. Once seen devoid of foliage, the form is not to be forgotten.

I must add that I see the bark as light gray or silvery, but the bark has also been described as brown, dark brown, dark gray or even tinged red. Everyone does agree that the bark looks somewhat like alligator skin as does the dogwood or the persimmon.

What about *Nyssa sylvatica* for the home grounds? An excellent choice, we believe, as a specimen tree, planted for summer shade or on the woodland border. It grows to a height of 90 to 100 ft., but 30 to 40 ft. is more commonly seen. Happily almost a disease-free tree, *Nyssa sylvatica* is nevertheless difficult to transplant and is a slow grower. If one buys nursery stock and takes into account the growth rate, nyssa should be a worthwhile investment. Although found

near water in the wild, it is not as choosy as reputed in its soil and water requirements, but it does thrive in slightly acid, poorly drained soil. It withstands extremes of heat and cold, and if you wish to attract birds, by all means consider the tupelo.

Nyssa sylvatica is found from Maine to Florida and west to Texas and is prolific in Pennsylvania woods. Bartram collected it on his early plant expeditions. It is found on his plant list drawn up from explorations made during the 1730's. Pepperidge Farm has made the tree a household word, too. The original Pepperidge Farm bakery flourished under the shade of two huge specimens of *Nyssa sylvatica*.

Our axe-wielding forebears must have known *Nyssa sylvatica* in a rueful way: the fibers of the wood are so intertwined that it is almost impossible to split. But the early American found many uses for it because of this characteristic. It was made into wheel hubs, boxes, chopping bowls, bungs for bung holes, wagon tongues, railroad ties, ironing boards, rolling pins, and many another useful item. The miners of anthracite found the wood of the tupelo ideal for making roller bearings to haul mine cars up steep slopes.

If you want to see the *Nyssa sylvatica* at its peak, hurry to the Morris Arboretum while it is still arrayed in all its fall glory.



by Ellen V. P. Wells

plant explorers and their books



by Elizabeth C. Hall



The many facets of plant exploration claim a fascinating group of dynamic personalities. Plant hunters fall into numerous categories. Some are interested solely in discovering flora new to science with little concern for plants of ornamental and economic value. The horticulturally minded plantmen are often professionals, sent out by botanic gardens and arboreta, horticultural societies, national governments, pharmaceutical concerns, commercial nurseries, and syndicates of owners of private estates. A few of these may be amateurs, mostly with a primary occupation such as missionaries, consular officials, adventurers, yes, and even spies. To all of these "curious" individuals we are indebted for the wealth of exotic plants in our gardens and for valuable new foods, fruits, spices, drugs and fibers.

Happily, some of these men have recorded their breathtaking adventures

and discoveries in journals and books that rival the thrilling "best-sellers" of today. To whet the appetite of "arm-chair gardeners" there are several introductory, all-embracing surveys that offer portraits of plant explorers, beginning with those sent out for cinnamon and cassia by Sankhara, one of the Pharaohs, to the leaders of plant hunting expeditions of the twentieth century. These historical and biographical accounts are well written, informative, and sprinkled with delightful humorous tidbits. I have listed the best at the end of this article.

The diaries and journals kept by the explorers themselves are invaluable. Our early knowledge of the rich flora and fauna of the remote parts of China comes from the work of a considerable number of French Catholic missionary priests. Abbé David's diary is an account of his journeys and observations in China from 1865 to 1869. Abbé David was a naturalist of unusual ability and made large and important collections of plants. In his honor the dove tree was named *Davidia*.

Another remarkable work is the journal kept by David Douglas during his North American travels from 1823-1827. The journal includes descriptions of 33 species of American oaks and 18 species of pines. Kenneth Lemmon evaluates the writings of Douglas when he remarks: "It is obvious that had he lived Douglas would from his journals have written one of the finest adventure stories of all times which, coupled with his success story as a plant hunter, would have been one of the most fascinating books to have come out of botanical travel."

Arthur Roberts Steele's *Flowers for the King* is a very human story. It brings to life the experiences of Perez and Pavon, two youngmen who set out from Cadiz in November 1777 on a quest that lasted more than ten years in the lands of Peru and Chile.

It is difficult to select only a few choice plant exploration titles from the wealth of publications of the twentieth century. Dr. J. Macqueen Cowan of The Edinburgh Botanic Garden writes of Frank S. Smythe, author of *The Valley of Flowers*: "Mr. Smythe has drawn our attention again to the west; it is not without satisfaction that he names the Bhyundar Valley 'The

Valley of the Flowers.' It is as rich as, and probably richer than, any valley in Sikkim. . . by his recent expedition he has established this fact, for he has brought back from there 250 plants, many of them representatives of the most popular garden genera."

Women plant hunters have been scarce but some fine ones have lived and it is always a joy to discover them. Alice Fullerton, a British botanist, has written of her 1933 plant collecting trip to Iran in *To Persia for Flowers*—a readable and most informative report of the little known flora and people of a fascinating country.

Mary Gibson Henry explored the Rocky Mountains, made more than 50 expeditions to the southeastern states and explored parts of northern Canada and British Columbia, that had never been mapped. She introduced many new plants and, more important, established the Henry Foundation for Botanical Research for native plant material in Gladwyne. Mrs. Henry contributed articles to botanical journals describing in exciting reports her many expeditions. Many of these articles are available in the PHS Library.

I have saved my favorites for the last: Ernest H. Wilson, Frank Kingdon-Ward and Reginald Farrer. All three have been blessed with facile, fertile and spritely pens. Their books, overflowing with contagious enthusiasm, line our horticultural society libraries' bookshelves. The many plants that they discovered and introduced into cultivation are familiar subjects in our gardens. "Chinese" Wilson passed through countless trials and tribulations in the rugged mountains of the Orient in his endeavor to find garden plants of special interest and beauty. It is said that he probably introduced more first-class woody plants to cultivation than any other individual collector yet. Some of his greatest finds were *Lilium regale*, *L. davidi*, *L. sargentiae*, *L. willmottiae*, and *L. speciosum*. Vivid glimpses of his exciting experiences are to be found in the pages of his two-volume work *Plant Hunting*. Kingdon-Ward's journeys in Assam, Burma, China and Tibet from 1909 to 1957, a span of almost 50 years, are well documented in his innumerable publications. *The Romance of Plant Hunting* and *Pilgrimage for Plants* are just samples of his

extraordinary faculty of sharing with his readers his observations that are often startling, always stimulating.

And finally we come to Farrer, a man of many talents: a novelist and playwright, self-taught artist, an excellent photographer, an ardent Buddhist, and an intrepid plant hunting adventurer with a garden in Yorkshire. He roamed incessantly in the Swiss, French and Italian Alps, the Dolomites, and during the latter years of his life in the mountains of Burma, China and the Tibetan frontier.

He was a controversial figure. Reviews of his books were not always complimentary. We read "He is too much inclined to clothe plants with merits they hardly possess"; "His likes and dislikes are fierce"; "His exuberance is very irritating"; "Where one word would suffice Farrer uses twelve." Yet, in contrast, there were many touching tributes such as "Few have ever known alpine as he does," and "He has revived horticulture by his picturesque and dashing enthusiasm." In answer to the criticism that his nomenclature was not always accurate, an American plantsman, Peter J. van Melle of Poughkeepsie, wrote: "It is because of the rare gifts of beauty which he bore, more precious perhaps than any fruits of taxonomy, that the world has forgiven Farrer his shortcomings. Heaven send us more such sinners."

A tragic experience took place. A native prince, who happened to have taken a dislike to Farrer because he had gone too far up a sacred mountain and had supposedly enraged the gods, ate up all of Farrer's fruits and threw away the seeds.

Farrer's two-volume publication entitled *On the Eaves of the World* contains the thrilling description of his finding *Viburnum fragrans* (now known as *Viburnum farreri*) in its native habitat. For centuries this shrub had only been seen in cultivation throughout China but never before had westerners found it growing in the wild. Later in the year Farrer went back to gather seed of this plant but a tragic experience took place. A native prince, who happened to have taken a dislike to

Farrer because he had gone too far up a sacred mountain and had supposedly enraged the gods, ate up all of Farrer's fruits and threw away the seeds. The fact that Farrer was a Buddhist was a helpful liaison with the Chinese priests. However, when he was on the Tibetan frontier his life was really in grave danger. He writes that because he had prominent gold fillings in his teeth he could not go disguised as a coolie but he announced that he was an important potentate and went under the title of "Governor General of Northern England." The end of the second volume of *On the Eaves of the World* brings us to November of 1914. Farrer remarked after his return to England: "On August 4, 1914 there was a terrible thunder storm which particularly frightened the natives who believed that the Gods were enraged. We saw no significance at that time but that was the day that World War I began."

Reading is a wonderful, vicarious way of traveling that brings much enjoyment. The books that I have selected for this discussion are offered as trial balloons into the realms of plant exploration. Try one or two and then follow the advice of Kenneth Lemmon: "I should like to think that the reader when he has laid down this book will go into his garden to find his heart quicken and his sympathies go out to the courageous adventurers, aware now of their intrepid exploits, as he sees the diversity and beauty of a herbaceous border, the nobility of the trees, the forms and colours of innumerable shrubs, the gay pelargoniums, the glories of autumn colour of the *rhys* and the *acers*, the glory of an orchid house and the strange but compelling beauty of the stove-house and greenhouse. He could well remember that not a single non-native plant he sees is there without the blood, sweat and tears of the botanical travellers."

After 30 years with the New York Botanical Society, Elizabeth C. Hall retired in 1967. She was at that time librarian and associate curator of education. Since 1967, Ms. Hall has been senior librarian at the Horticultural Society of New York. In 1970, she compiled a comprehensive catalog listing several thousand books: *Printed Books: 1481-1900 in the Horticultural Society of New York*. Ms. Hall graduated from the Pennsylvania School of Horticulture for Women in 1924.

reading list

The Plant Hunters *

Alice M. Coats
New York, McGraw-Hill Book Co., 1970
(original title: *Quest for Plants*, 1969)

Plant-Hunting in China

E. H. M. Cox
London, Collins, 1945
New York, Hafner Service, 1961

Abbé David's Diary *

Armand David; tr. by Helen M. Fox
Cambridge, Harvard Univ. Press, 1949

Journal Kept by David Douglas

David Douglas
London, W. Wesley & Son, 1914
New York, Hafner Service, 1959

On the Eaves of the World (2 vols.) *

Reginald John Farrer
London, Arnold, 1917
New York, AMS Press, 1971

To Persia for Flowers *

Alice Fullerton
New York, Oxford Univ. Press, 1938

Plant Hunters **

Frances L. Jewett and Clare L. McCausland
Boston, Houghton Mifflin Co., 1958

Pilgrimage for Plants *

Francis Kingdon-Ward
London, G. G. Harrap, 1960
New York, Taplinger, 1960

The Romance of Plant Hunting *

Francis Kingdon-Ward
London, Arnold, 1924

The Golden Age of Plant Hunters *

Kenneth Lemmon
London, Phoenix House, 1968

Billy Bartram and His Green World * **

Marjory Bartlett Sanger
New York, Farrar, Straus and Giroux, 1972

The Valley of Flowers

Frank S. Smythe
New York, W. W. Norton & Co., 1940

Flowers for the King *

Arthur Robert Steele
Durham, N.C., Duke Univ. Press, 1964

The Plant Hunters *

Michael Sidney Tyler-Whittle
Philadelphia, Chilton Book Co., 1970

Plant Hunting (2 vols.) *

Ernest H. Wilson
Boston, The Stratford Co., 1927



* Book available from PHS Library.

** Written especially for young people.



photo by author

Lee M. Raden is experimenting with air-conditioned alpine houses and new methods and techniques for propagating alpine plants. At present he is working mainly with Asiatic primroses and has started a program of growing rare Turkish and African bulbous plants from seed. Raden has served on the PHS Council for nine years.

ulmus davidiana pygmae

Dwarf plant material has a way of quietly sneaking into your life until you suddenly realize that it is a way of gardening life. You begin to covet any material that is a true dwarf no matter how difficult it is to find and no matter what the cost.

Sometime after this not so rare obsession caught up with me 10 years ago, I began to feel that I had become calloused to anything new in conifers, *Ericaceae*, alpiners or deciduous trees. That was until two years ago in November when Dr. Tsuneshige Rokujo of Japan visited my alpine house with Polly Hill, and in his very quiet manner suggested that I might like some cuttings. He produced two branch cuttings of *Ulmus davidiana pygmae* 1 in. long with leaves 3/8 in. long and 1/8 in. wide. I couldn't believe my eyes—the Japanese had produced a small miracle again. Compare it with the normal form of *Ulmus davidiana* whose height is 75 ft. to 100 ft. and leaves are 1 in. long and 4 in. wide.

I immediately potted the cuttings into stream sand in a 6 in. pot and placed a baggie over the entire pot, placed the pot under the bench in the alpine house and forgot to check for about 90 days. It was about late February or early March while checking to see if some calochortus and fritillaria bulbs had broken dormancy that I noted a lot of new green from the corner of my eye. The cuttings were showing about 1/8 in. of new growth. I shook them carefully out of the pot; the fibrous roots were less than an inch in length. The cuttings are now two year old trees. Like all elms, they are deciduous, losing their leaves sometime in October or November. (Remember, in the alpine house plants take longer to go dormant.)

At this time the trees are about 4½ in. high and have the typical elm branching. The skeptics now say, "What? 4½ in. in two years? That's not a dwarf!" Wrong! A true dwarf tree on its own roots at some point in time will get large. It may get very large but it is going to take a lot longer to get there than the true botanical specimen. Our genetic freak, hopefully, will get large, but with growth of about 2 in. a year, it is going to take years.

At latest count, we have five trees growing in different areas of the United States and more cuttings are being rooted. Hopefully, the tree will be distributed widely as soon as we can determine its hardiness, thus adding another Japanese gem to American gardens.

Lee M. Raden



photo by author

echinopsis antisii

Of the many cacti I admire for their unusual shape, their ability to survive, and their beautiful flowers *Echinopsis antisii* is my favorite.

My cactus collection began four years ago with a small package containing a few round, black and shiny seeds of *E. antisii*. They germinated rapidly in a light moist soil. For the next year they were nothing more than small round balls about the size of aquarium gravel with a little bit of fuzz on top. After the second year of growth in the garden the seedlings had reached the size of golf balls with tiny spines down the sides.

In the middle of the third year the plants measured about 3 in. across and began to form small, fuzzy, cotton-like protuberances. These rapidly developed into 5 in. long buds covered by long, slender, pink colored sepals. One evening toward sundown the buds began to open at an almost visible speed. Pure white petals emerged, hundreds of yellow anthers and a white style were exposed. Insects were attracted and took care of pollination. A month later several seed capsules containing innumerable seeds had developed. Another year later more than a thousand young plants had germinated from these seeds. I was now on my way to becoming a collector and dealer in cactus plants.

Echinopsis antisii is a masterpiece of nature's design combining simplicity, function, and beauty. Its construction is similar to that of a harmonica bellows with ribs and grooves that allow it to expand and contract according to the amount of water available. A thick skin preserves what little water the plant may have. Tiny but hard spines defend it against animals and man. Few animals will eat or even taste it because natural chemicals inside the plant give it an unpleasant flavor.

Since I planted my first seeds of *Echinopsis antisii* four years ago I have accumulated a collection of more than 200 different species of cacti. I have grown several thousand seedlings and cuttings, but *E. antisii* has always maintained its special place.

Peter Zutter

Peter Zutter is a cactus collector and the owner and operator of International Exotics Company. He propagates and sells cacti and some of the more unusual succulents to local plant shops. Peter is 14 years old and a student at William Tennent Intermediate High School.

mandragora officinarum

Perhaps no other plant has been the subject of as much folklore and mystical beliefs as has the mandrake, *Mandragora officinarum*. These beliefs stem from the fact that the thick, fleshy, tuberous roots frequently assume a shape that resembles a human body. So grew the early ideas about the power of this plant. Throughout history the mandrake has been used as an aphrodisiac, hallucinogen, medicine and poison.

The historian Josephus described the unusual process used for collecting the magical herb during his time (37-95 A.D.). He relates that, according to the popular Greek superstition, one had to tie a dog to the plant and then beckon the dog, so that the animal would pull up the plant. Any normal process for gathering the root, he claims, would surely result in an agonizing death for the collector.

The Romans considered the plant valuable for both its narcotic and restorative powers. Even in Shakespeare's work references to the mandrake's value in early medicine can be found. In the play *Antony and Cleopatra*, the queen commands: "Give me to drink mandragora—that I may sleep out this great gap of time my Antony is away." (Act I, Sc. v).

Chemists have since isolated the active principals in the plant, which scientifically back ancient claims. It has been found to contain both scopolamine and hyoscyamine, two very powerful alkaloids.

The mandrake, a member of the nightshade family, is an herbaceous perennial. The wrinkled, dark green, ovate leaves are formed in rosettes that arise from the characteristic fleshy root. Stems growing from the center of this rosette bear single purplish or greenish flowers that resemble those of the potato. Round yellow fruits about the size of a plum are nestled in the basal rosette. These edible fruits give the plant one of its more common names, the love apple.

The mandrake is native to Mediterranean areas and to Southern Europe, where it grows in deserted fields and forests. While infrequently cultivated in the United States, the plant can be seen at Longwood Gardens in Kennett Square.

Michael Balick



drawing by author

Michael Balick is a horticulture student at the University of Delaware. He recently completed a survey on the wildflowers of Israel, where he lived in 1972-73. He was named as the recipient of the PHS's first Outstanding Young Horticulturist Award in 1970. He plans to pursue graduate studies in horticulture in the near future.

classified ads

LORD AND BURNHAM GREENHOUSES for the care, cultivation and protection of tender growing plants; painstakingly custom designed to your specific horticultural needs, flawlessly erected, and delivered on time every time. Inquiry welcome. OED, INC., Villanova, PA. 688-4825.

Hundreds of satisfied green tenants... From the plant people who build greenhouses... Not builders who are green about plants.

Want **good** spring flowering bulbs? We carry most of the small species bulbs like *Erythronium*, *Leucojum*, *Fritillaria*, etc.; a long list of *daffodils*: rockgarden, cupped, double, collar and many other varieties; plus most of the good landscape varieties of *tulips*. J. Franklin Styer Nurseries, Concordville, PA 19331. Telephone: GL 9-2400.

Happy, active family with children needs live-in couple. Gardening, greenhouse background helpful. Apartment, board, Blue Cross. Start no later January 1. State salary, references with reply. Box 115, Rockland, DE 19732.

GROWING THOUSANDS. Plants for special uses. Partial list. **For Light Shade:** pachysandra, vinca Bowles, ajuga, hollies, rhododendron, hellebore, liriope, astilbe, etc. **For Rock Gardens:** heathers, dwarf junipers, *Ilex belleri*, perennials. **For Formal Gardens & Borders:** boxwoods, yews, dwarf spruce, cypress, etc. **For Bonsai (starters):** dwarf evergreens, Japanese maple, cotoneaster. **Our Work:** Ground Improvement - Soil Testing - Selection - Arrangement Design. 40 years experience. Personal service. Samuel Knight Cowell, Roxborough Nursery. List. Sales by appointment only. Call 828-3534, 6 PM best.

Horticultural Consultant Service. I have a BS degree in Horticulture from Penn State, with a 30-year background in the field of Horticulture and general Landscaping. I can help solve any problems or go over your property and make recommendations that could prevent problems.

Naturalistic to formal settings, plants and plant problems, site preparation and grading problems. Consulting done on a fee basis. Hugh J. Peeling, P.O. Box 5, Concordville, PA 19331. Phone (215) GL 9-3192.

Wanted: Customers for superior varieties such as: *Acer rubrum*, *Cercidophyllum japonicum*, *Cryptomeria japonica*, *Enkianthus campanulata*, *Hydrangea quercifolia*, *Ilex glabra compacta*, *Ilex 'Nellie Stevens'*, *Juniperus chinensis sargent*, *Pinus densiflora umbraculifera*, *Stewartia pseudo-camelia*, *Styrax obassia*. All, and more available from Rose Valley Nurseries, 684 S. New Middletown Rd., Media, Pa. 19063. Telephone Ben Palmer, TR 2-7206

WANTED: GARDENER-CARETAKER for Estate in Delaware. Experience in lawns and shrubs with farming background. Married but no young children. Wife to help care for two children. Three bedroom house on grounds available. Send resume with references. Reply to: Box H.R., Montchanin, DE 19710.

GREATER PHILADELPHIA ORCHID SOCIETY Annual Fall Auction. Exotic and easy to grow orchid plants. Thursday, 8:30 p.m., September 26, 1974, the Merion Friends Meeting House, 615 Montgomery Avenue, Narberth, PA (next to the General Wayne Inn).

Advertising copy should be submitted 8 weeks before issue date: November, January, March, May, July, September. Minimum rate \$5.50 (covers up to 35 words). Additional words 20¢ each. Less 10% discount for two or more consecutive issues, using same copy. All copy should be accompanied by check made out to PENNSYLVANIA HORTICULTURAL SOCIETY and sent to Patricia M. Cain, THE GREEN SCENE, 325 Walnut Street, Philadelphia, PA 19106.



Walter Lauer pots a meadow beauty on a wildflower rescue trip at Medford, New Jersey. The *Rhexia virginica*, most often found in damp meadows, was growing at a bog edge in acid New Jersey sands and now thrives in Lauer's Churchville, Pennsylvania, garden. See story on page 2.

THE green scene

HORTICULTURE IN THE DELAWARE VALLEY

NOVEMBER • DECEMBER • 1974

\$1.00



natural materials for
Christmas decorations



12



16



8



2



21



THE green scene

HORTICULTURE IN THE DELAWARE VALLEY

Volume 3, Number 2 Nov., Dec., 1974

published by
THE PENNSYLVANIA
HORTICULTURAL SOCIETY
325 Walnut Street, Philadelphia, Pa. 19106

Ernesta D. Ballard/*President*
Jean Byrne/*Editor*

PUBLICATIONS COMMITTEE
L. Wilbur Zimmerman/*Chairman*
Charlotte L. Archer
M. M. Brubaker
Frederic W. Clark
George M. Harding
Nancy Howard
Craig S. Oliver
Ralph M. Sargent

Patricia M. Cain/*Classified Advertising*
/Retail Distribution

Designer
Julie Baxendell
Baxendell Design Associates

THE GREEN SCENE, Volume 3, No. 2, published bimonthly, January, March, May, July, September, November, by the Pennsylvania Horticultural Society, a non-profit membership organization at 325 Walnut Street, Philadelphia, Pa. 19106. Subscription: \$5.00 — Single Copy: \$1.00. Second class postage paid at Philadelphia, Pa. 19104.

POSTMASTER: Send Form No. 3579 to THE GREEN SCENE, 325 Walnut Street, Philadelphia, Pa. 19106.

© Pennsylvania Horticultural Society, 1974

in this issue

- 1 Editorial *by Ernesta D. Ballard*
- 2 Christmas at the Pennsylvania Horticultural Society
- 8 The Basic Christmas Wreath
by Ed Lindemann
- 12 Heavenly Bamboo: Neglected in the Delaware Valley
by Charles W. Rogers
- 15 Digging for Information *by Ed Lindemann*
- 16 Exotics from Chichen-Itza to Merion
by Millie Gorson
- 21 Bending Nature to Art
by Edward A. Semanko
- 26 The Morris Arboretum: Dragons in Chestnut Hill
by Susan B. Blum
- 28 The Tyler Arboretum: The Oriental Spruce
by Gertrude S. Wister
- 30 Books and the Green World: Periodicals: Keeping up with Changes
by Julie Morris
- 32 Growing Interests
- 33 Classified Advertising
- Front Christmas at PHS.
- Cover: See story on page 2.

Front cover photo by Edmund B. Gilchrist, Jr.

Back cover photo by Edward A. Semanko



christmas trees: the right tree in the right place at the right time

Christmas trees first appeared in the United States in the 1830's, just when the Pennsylvania Horticultural Society was getting started. Perhaps some of the German communities used them earlier, but neither Christmas trees nor Christmas decorations as we know them were part of colonial custom. Nevertheless, the Christmas tree is now one of the focal points of our holiday celebrations.

The Currier and Ives vision of Christmas includes a group of pink-cheeked youngsters cutting the family tree and dragging it home through the snow. Today, that vision has been replaced by a stack of pre-cut trees outside supermarkets, tree service stations or the garden mart. More recently, well-meaning sentimentalists have been telling us that it is wrong to use a cut tree for Christmas; they say that we should use a "living" tree, a balled-and-burlapped evergreen that can be planted in the yard when the holiday season is over.

Now we at PHS are most assuredly in favor of planting trees. Indeed, PHS is, at the present time, heavily committed to a tree planting program called "10,000 Trees." But we believe in planting the right tree in the right place, at the right time.

Here is where the problems arise with "living" Christmas trees. In too many cases the tree is dead, or near to it after ten days in an overheated house. Seldom is the hole it's to go into ready, properly prepared with adequate supplies of unfrozen water nearby. And, all too often, there is no suitable location for a Douglas fir, spruce or Scotch pine, the three species most widely used for Christmas trees in the east. One or two of these might be acceptable, but how many home lots can accommodate a life-time grove of forest evergreens?

To put the matter bluntly, very few people will have the perseverance to plant a living tree, and very few of those that are planted will survive to grow to maturity. Most of us would be well advised to go back to the old-fashioned, cut tree, and to do so without a twinge of conscience. Modern trees are not taken out of the forest and do not represent the loss of potential specimens for our grandchildren. They are grown as a crop on cleared land and are continuously renewed by reseedling.

Approximately 450,000 acres in this country are devoted to the production of Christmas trees. About 30 million six-year old trees are harvested each year, and two to three seedlings are planted as replacements for each tree cut. It strikes us as being a very good use of land.

Ernesta D. Ballard

Christmas at the Pennsylvania Horticultural Society

Has any Christmas ever surpassed those of our childhood? When we watch a small child catching her first glimpse of a Christmas tree, do we not relive in some small measure the intolerable ecstasy of our own first magical vision. What other day of the year offers such universally perplexing and various responses, exhumes such a ragbag of joyous and melancholy memories.

If we can put aside our fantastic expectations for that holiday, as adults we can still find much in it to give us respite from our frantic daily cares. A beautifully wrought wreath, a Christmas tree festooned with natural materials, a cheerful looking topiary put together with a few bright dried flowers. All of these things put us in touch with Nature that is seemingly dormant. The berries, the cones, the seed pods, all remind us that important work is going on under the cover of winter.

An enthusiastic group of creative people worked on the PHS Christmas exhibit last year. The theme, "A Visit from St. Nicholas," was unabashedly nostalgic. We offer here some details about how the results were accomplished. I wish we had space to include everything that was in that show; unfortunately, we could choose only a few.



photos by Edmund B. Gilchrist, Jr.

To add contrast to a basic cone wreath, Mrs. Mowday added red sumac, yellow yarrow, yucca pods and Egyptian wheat.

Created by Mrs. Harold H. Mowday
Norristown Garden Club



gingerbread cookie tree: a child's Christmas dream

Delightful scents of ginger, cinnamon, cloves and molasses fill our kitchen as the family gathers around the ancient table to make the cookies for the traditional gingerbread tree. The cheerful crackling of the open fire gives protection from the biting cold of the early winter days. This is a treasured time of year for our family as each member contributes to making the old-fashioned tree.

First, we create the designs. Ideas are made into sketches; then a pattern is cut from wax paper. The pattern is placed on the chilled gingerbread dough and the cookie is hand-cut using a sharp knife. After baking, the cookies are painted using artists brushes and sugar paint.

In 1972 our family decorated a tree for the Christmas Show using decorations that were botanical in origin. The theme of the 1973 tree was "A Child's Dream of Christmas." It was designed to express the excitement of a child as he dreams of the wonderful holidays. Underlying the total design were cookie characters depicting the Christmas story. Santa Claus, ballet and nursery rhyme characters were used to show the fantasy world of Christmas. A handmade star was used at the top of the tree to symbolize the Light of the World and the Hope of the Ages.

The Johnson Family Gingerbread Dough

Mix 1/3 cup soft shortening
1 cup brown sugar
1½ cups dark molasses

Stir in ½ cup cold water

Sift together and add to mixture

7 cups flour
1 tsp. salt
1 tsp. cinnamon
1 tsp. ginger
1 tsp. cloves

Chill dough. Roll to ¼ inch thickness.

Cut wax paper pattern. Hand-cut cookie using knife with sharp point. Make a hole in top of cookie for hanger. Bake at 350° for 13 minutes. Paint with sugar paint using artist brush.

Sugar Paint

1 box confectioners sugar
3 egg whites
Use vegetable dye for color

Created by the Loren Young Johnson family of Medford, New Jersey



Christmas angel

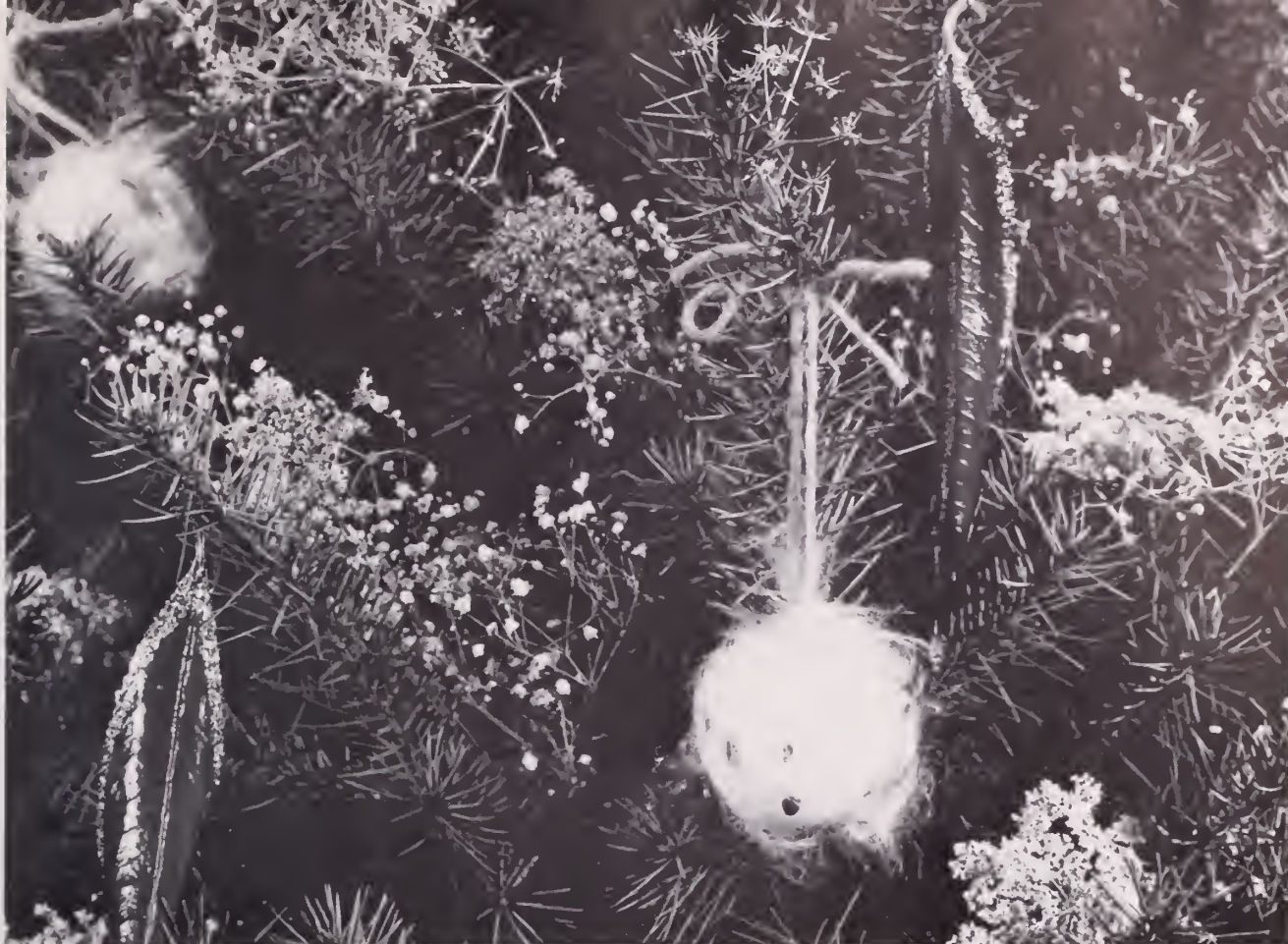
This angel is four feet tall and made from varying sizes of Boston ivy leaves stapled onto a plywood cutout. The face, hands and feet were fashioned from mixed bird seed (the sunflower seeds were discarded because the color is too grey). The seeds were laid over a surface of Elmer's glue. The seeds give a flesh tone to the angel. A raisin for the eye, a strip of orange peel for the mouth, and a curled corn husk round out the head. The wings were made from yucca leaves, which were stapled on. The smallest ivy leaves were placed at the angel's waist. The leaves at the knees were turned in a slightly opposite direction to give the impression of movement.

crab apple kissing ball

The kissing ball is made from crab apples mounted on a four-inch styrofoam ball. Heavy florist's wire was run through the ball. At the bottom the wire was run through a one-inch square piece of cardboard and bent into a "U" shape to make it more secure; it prevents the wire from pulling out of the ball. The crab apples are stuck on the ball with heavy florist's wire. The apples on the bottom are secured with the same "U" turn principle. Boxwood leaves are tucked in-between apples, and the kissing ball is hung with a red velvet ribbon. The crab apples were picked from the trees in the late fall and stored in a cool basement.

The angel and the kissing ball were created by Kay Price of Wayne





a fairyland tree

I wanted to simulate a snow covered tree that would glisten in the sunlight by day and the moonlight by night, a kind of fairyland tree.

I collected and prepared the natural materials throughout the summer and fall: baby's breath, Queen Ann's lace, fluff from milkweed pods, and rhododendron leaves. The tree was a lovely soft 6½ ft. Douglas fir.

To give a billowy effect, baby's breath was sprayed with white paint, air dried and pushed into the branches. The fullness of the tree kept the stems in place and out of sight. Queen Ann's lace was also spray painted white and dried in silica gel. The baby's breath and Queen Ann's lace were spray painted because they sometimes lose their white color when dried naturally. Silver glitter was added by first applying Elmer's glue (diluted half and half with water) with a soft artist's brush, then sprinkling on the glitter and let dry.

Snowballs were created from styrofoam balls in varying sizes, 1½ in. to 3 in. in diameter, smeared with glue and shaken in a bag of milkweed fluff. Wire loops for hanging were held fast with full strength glue. The loops were made from paper clips and bobby pins. The

snowballs were hung on the tree with apple green yarn.

A star-shaped dry weed or wild-flower, blown free of its petals, name unknown, was picked along the roadside, sprayed with silver aluminum paint, glittered and pushed among the branches. These resembled twinkling stars.

To give color, red umbrellas were made of rhododendron leaves of various lengths, 5 in. to 9 in. Each one was rolled into the shape of a cornucopia or a furred umbrella. To keep it secure while I later stuffed it with newspaper for the drying process, I wrapped it with facial tissue and somewhere near the center held it with a twistum. To give it body while it was being dried, I made another cornucopia with four thicknesses of newspaper, roughly 5 in. to 7 in.; it was then put inside the leaf and more paper was stuffed to give it a smooth, round umbrella-like surface. The paper was removed after the drying process. The leaves are dried in a 100° oven for about four days and four nights. The first two dozen I made were practice. The next four dozen were used on the tree. After drying, they were sprayed Christmas red. My advice is to give

them an undercoat of white paint since the leaves turn brown when drying. If you don't use the undercoat, the bright red paint will appear maroon even after several coats of red. It should take one coat of white and no more than two of red. The umbrellas were then glittered around the top and tips and hung with Christmas ball hangers by the stems, which curved like cane handles when dried.

The top ornament was a bouquet of foxtail grass, spray-painted silver and tipped with silver glitter, which gives an interesting shimmering optical effect. A white feather bird was perched on its center. One small red cardinal landed on the upper part of the tree.

For last minute details and to meet the deadline, an SOS call was made to some Spruce Hill Garden Club members who came to my home for a glitter bee. The whole project was fun, though time consuming, but the end result was what counted.

All the decorations are reusable and have been carefully stored in my attic where they will stay dry and be used another year.

Created by Gertrude Barnes, Drexel Hill Spruce Hill Garden Club

continued

Christmas creatures from natural materials

Each year when the Shipley School receives an invitation to participate in the PHS Christmas exhibit, I accept with trepidation because I fear we have spent all of our creative skill on last year's exhibit. However, after a short discussion with the students and the gathering of dried materials, ideas begin to evolve.

Milkweed pods turn into mice with seed eyes. Hemlock cones with wings and tails made of pine cone scales turn into wrens. Oak leaves, twisted cone fashion, clothe an angel. Her wings are also made from leaves and a buttonball covered with a corn husk becomes a head.

Gourds can be made into humorous grotesques; the one pictured here is made with seeds, weeds and an acorn nose. Some students fashioned gourds into cosy nests for little birds. The birds were often inspired by Dr. Seuss' zany creative creatures; they were



made from seed pods, cones, grasses and dried vegetables.

We followed a few basic design rules:

- Contrast; use light and dark colors. For example, see the attractive contrast between the yellow and red corn strung up together.

- Consider the scale of the tree; try not to make decorations too large or too small.

- Try to make decorations as durable as possible. We use Elmer's glue rather than rubber cement, and we back materials with masking tape where possible.

Created by The Shipley School Art Department, Bryn Mawr
Charlotte Ridpath, Head of Art Department

table topiary

This two-foot topiary was made by first lining the basket with saran wrap and pouring in plaster of paris. The dowel was placed in the plaster of paris. When it was secure enough, I placed the ball atop the dowel. The styrofoam ball was painted a copper color. (Be careful when painting styrofoam lest it melt; some new craft paints available in hobby shops and department stores will not melt the styrofoam. Check the label when buying.)

The dowel was covered by winding an apricot ribbon around it. Wire was used to secure the yarrow, holly and baby's breath on the ball. The stems and wire were tipped with glue.

At the base of the dowel, pine cones were glued to the plaster of paris. Baby's breath was interspersed to cover gaps. The same color ribbon used to cover the dowel was attached at the base of the dowel.

Created by Mrs. Walter Hutcheson
West Chester Planters



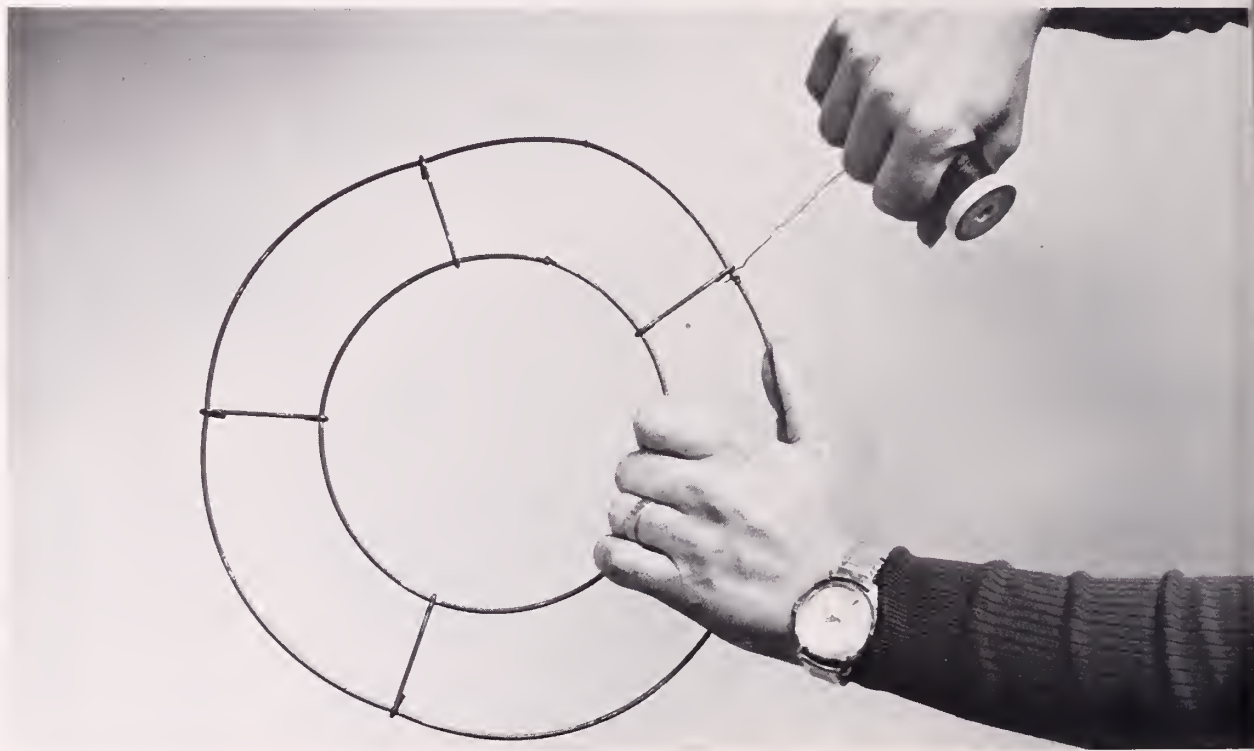
THE BASIC CHRISTMAS WREATH



by Ed Lindemann

Christmas wreath making takes planning and a little effort, but the end product is a rewarding sense of accomplishment. A few basic materials, a few hours of time and a dash of artistic imagination are all that is required to create a thing of beauty that will be a joy, if not forever, at least throughout the holiday season.

A wire frame forms the backbone of the wreath. Frames are available at garden centers, florists and commercial supply houses. If you are unable to locate a ready-made frame, you can make one from old coat hangers. Wire, wire cutters, pruning shears and evergreens complete the list of necessary materials. Ribbon, pine cones, berries and variegated foliage are optional.



- 1** The basic wreath is started by attaching wire to the frame. Use wire that will bend easily, yet will be strong enough to withstand being pulled tightly. Make sure that the wire is attached securely to the frame. I find it easier to leave the wire attached to the spool which provides leverage when pulling the wire tight. The wire will be used to secure the greens to the frame.



- 2** Greens for the wreath should be as fresh as possible. Try to pick greens that have a good uniform color and texture. Bundled greens or Christmas tree boughs can be purchased or you may collect from your own evergreens. Balsam, yew and pine are good for a wreath. The beginner will find that balsam or yew is easier to work with than the slippery longer needled pine. Once you have chosen your greens cut them into pieces six to eight inches long. Try to make as many "terminal" cuttings as possible; see illustration, a terminal cutting makes only one cut necessary, thus preventing blunt ends from showing.



- 3** After the greens have been cut, form bunches using five or six of the pieces per bunch. Those pieces that have a cut end showing should be placed at the back of the bunch. Make sure that the needles are all facing the same way. Hold the base of the bunch firmly and let the top fan out as shown in the photo.

9



- 4** Place the bunch of greens on the frame and holding the spool in your other hand attach the bunch to the frame by wrapping the wire around both. Be sure to pull the wire as tightly as possible. If the bunches are not attached tightly they will work loose in the wind and the wreath will eventually fall apart.

continued



- 5 Additional bunches are added in the same manner until the frame is completely covered. Keep the bunches all going in the same direction. Each bunch should overlap the previous one by approximately one third. The bunches are placed on the frame in a "fish scale" pattern each overlapping the last.

It will usually take 12 to 15 bunches to completely cover a 10 in. wire frame. The number of bunches will of course depend on their size. Remember also not to use too large a wire frame. A 10 in. wire frame will make a wreath approximately 15 to 18 inches in diameter.

- 6 To secure the last bunch on the frame it will be necessary to pull back the tip of the first bunch and wire the base of the last bunch under it. After all of the bunches are attached, cut the wire from the spool and wrap it securely around the frame. The last step in finishing off the basic wreath is to carefully and lightly trim the outside branches to create a uniform shape. If your bunches are all similar in size it will not be necessary to trim them.



- 7 Decorations such as pieces of showy foliage, sprigs of berries, seedpods and pine cones are made up into small bunches similar to the bunches of basic greens. After the bunch is wired together it is then wired to the frame. Take care to work the wire through the basic greens so that it does not show and fasten it on the back side of a frame.

Pine cones may be easier to work with if they are wired individually. Your wreath's design will be more pleasing if you use an odd number of decorations, usually three or five.

You may or may not wish to add a bow. If you use ribbon make sure that it is weatherproof. If you are going to hang your wreath in front of a window you may want to place greens on both sides of the frame, alternating sides as you go. If the wreath is to hang in front of a window, it is worth the extra effort to make a double wreath.

PHS horticulturist, Ed Lindemann, has outlined here only the basics for making Christmas wreaths. The variations on a theme are endless. The PHS Library has several books available that will take you beyond the steps outlined in this article. They are:

New Ideas for Christmas Decorations
Nora Fields
Hearthside Press, Inc.

Christmas Decorations Say Welcome
Beth Hemingway
Flower Publications

Gifts From the Garden
Suzanne James
Hearthside Press, Inc.

A Merry Christmas Herbal
Adelma Grenier Simmons
William Morrow & Company, Inc.

New Decorations with Pods, Cones, and Leaves
Eleanor Van Rensselaer
D. Van Nostrand Company, Inc.



heavenly bamboo:

NEGLECTED IN THE DELAWARE VALLEY



by Charles W. Rogers, Jr.

The leaves are a light and lovely green changing to a beautiful red in autumn. The fruit, too, is lovely, turning brilliant red by the fall of the year. Is it any wonder that the Chinese call *Nandina domestica* heavenly bamboo? The plant, native to China and Japan, has a delightful folk tale attached to its history. The Japanese story goes something to the effect that when a man and wife have a family argument, the husband being a perfect gentleman does not shout at his wife, but leaves the house, enters the garden and soundly scolds the *Nandina domestica*. When his fury is vented, he returns to his wife a peaceful man.* Perhaps that is an interesting way to explain the species

name of *domestica*, a means of helping to solve domestic quarrels.

Nandina domestica is an interesting and worthy shrub that is not as familiar to Delaware Valley gardeners as it should be. Nandina is a member of the *Berberidaecae* (Barberry family). This group also includes plants that are familiar to local gardeners such as barberry and mahonia. It is an evergreen shrub that grows to eight feet with many canes to a plant. The foliage is soft and delicate, similar in appearance to some of the narrow leaf bamboo. The plant has bisexual flowers that bloom in late May or June, which when pollinated and developed, produce red fruit by late fall. Experience

with nandina in the Delaware Valley indicates good growth in both sun and partial shade. Bailey's *Hortus Second* lists *Nandina domestica* as well as a variety, *Nandina domestica* Alba. The habit of growth and amount of fruit in both the species and variety are the same. However, there are two distinct differences with the variety Alba. First, the foliage is a lighter green and does not change to the bright red in the fall. And second, the variety Alba by its name indicates white fruit. But a closer look reveals a fruit that is more ivory or light yellow than a pure white.

The requirements for *Nandina domestica* in the Delaware Valley are similar to those for a group of plants

*Editor's Note: The literature does not show how the wife vents her fury. Perhaps the Western influence on Japanese culture will indicate an outlet.

Nandina domestica grows in a well protected area using the wall as a windbreak. These are at the Philadelphia Zoo in the city.



photo by Franklin Williamson



Nandina domestica blossoms for about two weeks in late May, early June.

photo by Franklin Williamson

that I refer to as "iffy" (rhymes with jiffy). *If* the winter weather is right, *if* the summer moisture is right, and *if* it is planted in the right location it will flourish. Some of the other plants in my "iffy" group include *Magnolia grandiflora*, crape myrtle, *Ilex cornuta*, *Camellia japonica*, *Ligustrum lucidum*, as well as a few others. *Nandina* grows best in a light, sandy soil with some peat moss added. A liberal coating of mulch and no cultivation around the root system insures a more vigorous growth. The mulching serves several

purposes including moisture retention, weed control, insulation of the soil to control the effects of freezing and thawing in the winter, and as a possible place for seed germination.

In my opinion, the fruit is one of the finest natural Christmas decorations to be found.

The location for planting *nandina* is perhaps the most important consideration. Since it is a "tender" plant it requires a location that will afford it

protection from the winter winds. Therefore, a spot on the east or south side of a building, wall, or fence should give it the required wind protection. Such a spot will provide some warmth, which will aid in earlier blooming and a better development of the fruit.

Nandina is listed as an evergreen and during mild winters it does retain its foliage. However, during a severe winter or if planted in a windy location, you will find that in February, March, and April it will lose all of its foliage. Plants are root hardy in the Delaware

continued



Two Christmas arrangements made from nandina grown by Charles Rogers. At left is the white nandina arranged with several kinds of holly leaves including the variegated. At right are the red berries with holly leaves.

Valley and after a hard winter, when all the foliage is lost, most plants will come back into new growth by early May. The only serious damage may be the loss of a few canes killed to the ground level.

The fruit of the nandina begins to color in early November and achieves its brilliant red by Thanksgiving Day. Anytime after they have matured they can be picked for Christmas decorations. Freshly cut fruit can be stored up to four weeks, if they are wrapped airtight and kept at about 40°. A couple of warnings about the mature fruit: first, they are sometimes raided by birds in late fall or early winter, especially during a cold spell and secondly, the fruit will turn dark brown or black if the temperature drops to 10° or lower. The fruit of var. Alba is much more susceptible to damage from cold than is the red fruit.

Propagation is very easy if one has the patience to wait one and a half to two years. Propagation by seed is the most accepted method. The seed is harvested and planted in a prepared seed bed in the late fall or early winter. Fruit that has been used in Christmas arrangements can be sown in the same manner after the Christmas greens are thrown away. However, the percentage

of successful germination with this seed is greatly reduced. Nandina seed so planted in the late fall will not germinate until the next August, and should remain in the seed bed until they are about year old seedlings. They then can be potted or set out in a seedling bed or frame. My experience indicates at least four years from seed to the first bloom. A lazy man's way to propagate by seed is to let the fruit fall to the ground under the bush which has been mulched with peat moss, licorice root or other suitable material. And with some luck and no cultivation, by the next August he should have a nice crop of seedlings started. The first year seedlings should be protected during the winter for the next two years.

Nandina domestica is a handsome plant when used in a landscaping plan. It seems advisable, however, to plant in groups of five or more plants. Although nandina plants are bisexual, the fruiting seems to be heavier when planted in groups than when planted as a single specimen.

With all the many fine qualities *Nandina domestica* possesses as a landscape plant, the foliage, fall color, and overall character, the most important part of the plant is the fruit. In my

opinion, the fruit is one of the finest natural Christmas decorations to be found. The long branches of berries can be used in almost any way to enhance an evergreen arrangement. Cut and wired with holly, it can make an evergreen wreath the most handsome on the block. It is most effective in any arrangement with white flowers and when used with Burford holly and miniature carnations in the shape of a small Christmas tree, it makes an ideal table centerpiece. A favorite use of mine is in arrangements for a church altar. I have used small leaved *Magnolia grandiflora*, green and variegated English holly with red and white *Nandina domestica* in a formal part of arrangements. The effect is most striking with the nandina brilliant color showing forth. A final benefit of the fruit is that it dries several shades darker and lasts for years in dried arrangements.

Nandina domestica is a lovely, graceful plant with great fruit. Shouldn't it be found more often in the Delaware Valley?

Charles W. Rogers is staff horticulturist at the Philadelphia Zoo. He has been experimenting for years with nandina at his home in Norristown and on the zoo grounds.

by Ed Lindemann,
horticulturist

digging for information

Many people give and receive plants during the holidays. Each year, after the holidays, the PHS staff receives dozens of inquiries about the proper care of these plants. I've listed here cultural directions for five of the plants that account for the majority of our calls in early January.

poinsettias

Poinsettias are highly sensitive to draft, temperatures below 60°, a lack of humidity, and dried out soil.

Even with all these problems, it is possible to get a poinsettia to bloom again. After your poinsettia is finished blooming and its leaves have turned yellow and dropped, put it in an area where the air is dry and the temperature ranges between 50° - 60°. Give the plant little water until May, once every seven to 10 days. At that time cut it back to 6 in. - 8 in., repot it into a well-drained container just large enough to hold the roots. Use a general purpose potting soil. Keep the plant well watered and in a sunny location where the temperature is 60° - 70°. Do not allow a great number of shoots to develop. Once the weather outside is warm you may place the plant outside, sink the pot to its rim in a sunny place. Fertilize regularly during the summer and lift it out of its hole every week to break off roots that have grown down into the soil. At the beginning of August, pinch the shoots back; let a few thick shoots develop and remove all of the weak growth. Before the nights turn cool bring the plant indoors, but grow it in full sun. Remember to start the night treatment on or about October 10.

It has been proven that in order for a poinsettia to flower it must have a long night, 12 hours of darkness. If you want your poinsettia to bloom, it must be grown in a room that is not lighted at night. If this is not possible, you can construct a cover of black cloth or heavy paper, which should be placed over the plant at sundown each day. The time to start this light-dark treatment is from October 10 on through Christmas.

christmas cactus

Known botanically as *Zygocactus*

truncatus, the Christmas cactus is a spineless tree-perching cactus from Brazil. It is an easily grown house plant that needs more water than most cacti and prefers a general potting soil. Usually grown as a pot plant, the Christmas cactus makes a very attractive hanging plant.

Provide these plants with a warm temperature and a high degree of humidity. Keep the plant in a sunny window during the winter months and partial shade during the summer.

As with the poinsettia, these are short day plants, they need 10 to 12 hours of darkness in the fall to set their buds. Follow the same directions for 12 hours of darkness as given for the poinsettia. Christmas cactus can be propagated by stem cuttings, which root easily in perlite or vermiculite. Rooted cuttings take approximately two years to bloom.

cyclamen

Give the cyclamen plant to a friend with an unheated sunporch. Cyclamen plants last only a short time when placed in the average home; they will not tolerate dry warm air. A night temperature of 45° and a day temperature of 55° - 60° is perfect to keep this plant blooming.

After your plant stops flowering, reduce watering and allow the top to die back. Place the tuber in its pot in a cool shady place. Water only every two weeks. After frost set the pot outside in a shady place. Repot in mid-summer and increase watering. If the plant fails to produce lush growth within a month discard it.

If your tubers show a lot of new growth, keep it well watered. When the buds show, provide a high degree of humidity and fertilize every month.

kalanchoe

Usually it is the *Kalanchoe blossfeldiana* or Tom Thumb kalanchoe that we see as holiday plants. This plant is also a short day plant. It is an extremely easy plant to grow as it does not require certain temperatures or a high degree of humidity. Give a kalanchoe plenty of sunlight and don't over-water.

Remember that it is a member of the Crassulaceae family and should, therefore, be treated as a succulent. Provide it with slightly more water than most succulents during the hot summer months.

Kalanchoe blossfeldiana usually does not bloom heavily the second winter. It is suggested that you start new plants from seed every year. Collect seeds from old flower heads and start in March in either milled sphagnum moss or vermiculite. Grow indoors during the summer in a cool window. If you want to try getting your plant to bloom a second year, cut the tops back after the plant is finished flowering.

holly cuttings

Many people who receive potted holly cuttings loaded with berries are disappointed when they wither and dry up within a few months. These "miniature" trees as they are called are usually rooted cuttings of English holly (*Ilex aquifolium*) or American holly (*Ilex opaca*). Unless you have the proper conditions for growing them on, they should really be treated as a temporary holiday decoration and are not meant to be kept as permanent house plants.

These plants are hardy and survive winter temperatures below zero degrees. If they are to live and mature they must go through winter dormancy each year. Since these cuttings are rooted during the summer months and have been kept in a propagating house, it is very important that they be gradually hardened off before being placed out of doors. Your potted rooted cutting should spend its first winter under cool greenhouse conditions. If you don't have a greenhouse, a cool sunporch or bright cool window will usually do. In the spring after all danger of frost is past, place the plant in the ground outside. Check that the soil does not dry out, and mulch well the first few winters until the tree is established.

Remember that when these plants arrive as gifts they are in a weakened condition and if they are kept in a hot dry room as a decoration they will have little chance of survival when placed outside.



Clockwise from bottom: *Sansevieria stuckyi*, *Kalanchoe mortagei*, *Opuntia* sp., *Beaucarnia recurvata*.



photos by M. Gorson

Exotics from Chichen-Itza to Merion

Let the buyer beware. There are many pitfalls when buying plants abroad to carry back home. Here is one traveler's harrowing and sometimes hilarious account of her adventures on a plant buying trip to Mexico.



by Millie Gorson

"Chichen-Itza, Cuzumel, Uxmal." My husband was reading a travel brochure.

"Beaucarnea, adiantum, sansevieria," I said dreamily.

"Millie," Mac said, "we're going to the ruins of Yucatan, not to Italy."

In the days that followed our discussion, the idea of visiting nurseries and buying plants for myself and my clients in another country really began to take hold. Fantasies about unusual succulents, cacti and palms that might be available built up to such proportions that I decided to find out what problems might be involved in bringing them back to the United States.

I called Barnes Arboretum, and Betty Wheeler, the director's secretary, suggested that I write to:

Permit Section, PIB

Agricultural Quarantine Inspection
APHIS, USDA

Hoboken, New Jersey 07030

By return mail I received application for an importation permit and a booklet that contained such numerous and detailed instructions that my first impulse was to throw it away and forget the whole thing. But the idea of buying the plants had taken hold of me. The application was easy to complete. I just had to list the places to which we were going, the plants we were going to import, the port of entry (it has to be one with a USDA quarantine inspection station) and how they were to be brought back, i.e., were they to be carried by me, shipped by parcel post or air freight.

During a telephone conversation, Charles Andrews, head of the import section at Hoboken, suggested that I plan to ship my plants back by parcel post as the most convenient and inexpensive way. He sent me green and yellow mailing labels with my permit number to place on my packages to identify them as plant material and to direct delivery to the USDA Quarantine Inspection Station in Miami. He advised me to put my name and home address and to list both the generic

and common names of each plant enclosed inside each package to be shipped back.

By the time we finally left Philadelphia, I felt I knew all that I needed to know about buying plants abroad. Although we were primarily going to visit the ruins of the Mayan Indians, plants were uppermost on my mind on the long flight from Philadelphia to Merida, the capital of Yucatan.

The small towns through which we traveled on our way from the airport had an occasional hibiscus, *Ficus decora*, as well as some fruit trees. The sparseness of the landscape was in sharp contrast to the airport in Merida, which we had just left. There the well designed, meticulously groomed tropical gardens were a sheer delight consisting of *Chamaerops humilis* (European fan palm), *Agave americana*, *Beaucarnea recurvata* (pony tail palm), *Ficus decora*, crotons, *Euphorbia pulcherrima* (poinsettias), *Asparagus sprengeri*, *Nephrolepis exaltata* (Boston fern), rhoeo (Moses in the bull rush) and lush hoards of *Setcreasea purpurea* (purple wandering jew). It had been exhilarating to see these

When I returned to my room I opened the door and there were two crates that looked more like coffins.

plants in the sunshine, so soon after our arrival. Here they grew in such profusion and variety, while at home we had to grow them indoors with such meticulous care and attention.

a find

The drive from Merida to Chichen-Itza takes a few hours. We found a hilly terrain but the flora was still the same, dried out weeds, grasses and overgrown vines, browned by the long dry winter. Smack in the middle of this desolate place lay the Mayaland Hotel, a magnificent, rambling hacienda planted as exotically as the Merida Airport only more so.

Mac and I settled quickly in our room. We then began to pursue the main purpose of this portion of the trip, which was to explore the Mayan ruins. As Mac took dozens of pictures, I scanned the area for at least one plant to take home. Nothing! The next day, while exploring the north section of the ruins, I saw an exotic plant—a bamboo palm (*Chamaedorea erumpens*) growing wild among the temple remains. I had no spade, trowel, or even spoon with which to remove this find. It had never occurred to me to bring something with which to dig. Fortunately, some men were weeding the site around the great temple that was being reconstructed. In a few seconds after using pantomime, I had persuaded a man to dig a palm and I lots of maiden hair (*Adiantum trapeziforme*). That was the extent of what was available in Chichen-Itza. I wrapped the roots in hotel plastic laundry bags and wetted them down to keep them from drying out.

At 4:30 that afternoon we returned to Merida, our last stop before our vacation to Cazumel. Time was running short and I knew it was the last stop for the "exotics" I wanted to buy.

We hired a cab driver to take us to a nursery where I was told there would be a large variety of tropical plants. By the time we arrived at the farm, which was surrounded by a high iron fence, the excitement at the prospect of buying had mounted greatly—only to be crushed by a "closed" sign. As I peered through the bars I saw sansevieria, pony tail palm, ferns, dracaenas, palms, *Kalanchoe mortagei*, *Livistona chinensis* (Chinese fan palms), *Opuntia elata elongata*, and *Pandanus sanderi* 'Roehrsianus.'

After a short discussion with the caretaker, our cabbie told us the place would be open at 9:00 a.m. the next day. I was sick; that was the time Mac and I were to arrive in Cazumel. Since these plants were just what I had been looking for, we decided that I would stay on an extra day and meet Mac in

continued

Cazumel the day after.

My cab driver became an expert on the location of plant places overnight. The next morning he first took me to a woman who specialized in ferns and high prices. I bought nothing. Next he took me to Planatas Ornamentales, a garden center on a lovely boulevard in the suburbs of Merida. There, row after row of bananas, dracaenas, European and Chinese fan palms were arranged for sale. It was the type of nursery one might find in Florida.

After I made my purchases, *Dracaena deremensis* 'Warneckeii,' bananas (*Musa nana*), some pony tails, *Dracaena fragrans* and Chinese fan palms, my driver explained to the salesperson that the plants had to be thoroughly washed leaving no soil on the roots and then packed in boxes for shipment to the U.S. My driver would be back later to pick them up before noon, closing time.

Next we drove back to the nursery that had been closed the day before. It even looked better in the morning light. Beaucarneas five feet tall beckoned me. The quality and size of the kalanchoe were unreal. I quickly pointed out the plants I wanted. The old custodian laughed at my excitement and scratched his head when my driver told him to wash the soil off the roots before they were packed. The driver and he had a lengthy discussion about the price, and we were told to be back before 3:00.

every bit of foreign soil removed

By now, it was 11:45 and we drove back to Planatas Ornamentales Garden Center. When we arrived, my salesperson pointed to the packed boxes and smiled. I didn't return the smile because I was worried about whether the roots had been washed and, as the USDA booklet admonished, "every bit of foreign soil removed." I asked to have the boxes unpacked so that I could look. They refused. My driver started to argue loudly in Spanish. I believe they would have still refused, but the owner had just arrived to close

the place for the holiday and came over to us. He asked me in fluent English what the problem was. I told him, and he not only personally opened each box, he saw to it that each root was washed, ordered one of his men to buy cotton which he wetted down, wrapped around the roots, then placed them in plastic bags tied with rubber bands. I found out that he had been trained as a forester in Louisiana but that as a result of family pressures he had returned to the landscaping business in Merida. As we talked and he

As I began to unpack the boxes the old farmer had prepared I was horrified. A large bug jumped out scaring me half to death.

worked, I told him that I did not see any *Hylocereus undatus*. He smiled, stopped what he was doing and went over to the fence between his property and that of his neighbor, reached through and broke off a piece of the night blooming cereus plant and handed it to me. (I have since potted and flowered it in the greenhouse. And it has literally grown to the roof.)

Later that afternoon, a new driver and I drove back to pick up the plants from the nursery. We arrived a half-hour late. There on the outside, gate locked behind him was the old man, washed and dressed, patiently waiting with my plants in boxes around him. As we drove away with the boxes in my trunk I wondered whether the plants had been properly prepared; I hadn't had the heart to ask.

It had also dawned on me that these boxes would never stand the trip back to the U.S. The booklet from the USDA had contained suggestions on containers. I asked my driver if he knew where I could get some crates or packing cases, but he explained that everything was closed on Saturday afternoon.

When I returned to the hotel, I asked the manager if he had any idea

where I might obtain containers. He suggested that the hotel maintenance man might be able to make some for me, and he sent for him. When the maintenance man arrived, I explained that I wanted a slatted crate and held out my arms to show him the size. He seemed to understand. I decided to enjoy what was left of the afternoon, walking through the open air market to the center of Merida.

coffins

When I returned to my room I opened the door and there were two crates that looked more like coffins. In an excess of generosity the maintenance man had more than doubled the size. One would more than do.

As I began to unpack the boxes the old farmer had prepared I was horrified. A large bug jumped out scaring me half to death. It took considerable control to keep from screaming. After inspecting the plants I found the soil was still packed around each root. Clean roots was a rule I knew I would have to follow since the USDA would destroy anything coming into the United States that had foreign soil on it. When I saw scale on some of the cacti, I took my pruning knife and removed the roots from each succulent. I spent the next three hours scrubbing the plants, first in the toilet, as one would wash a diaper, then in the tub. What a mess! My only fear came when the toilet began to overflow, and I had visions of flooding the palatial atrium in the lobby below.

The big job of drying, packing and listing each plant with generic and/or common names then followed. The succulents wouldn't need moisture and the fact that I had the boxes made with slats for air circulation helped. The boxes packed at the first nursery were done well so I just placed them among wads of crumpled newspapers to prevent any mishap during travel back to the U.S. The plants have to be packed gently but firmly, much as one would pack fine crystal for shipment.

At 12:30 a.m. Saturday I collapsed

in bed, unfed, a bit frightened and worried about how I would ever get the casket to the airport at 6:30 a.m.

The next morning it took three men to load the casket into the trunk of my cab. My trip to the airport took, four times as long as I had anticipated since my cab driver stopped every three blocks to check the security of the boxes.

When I arrived in Cazumel, my problems began in earnest. A three day Mexican holiday was in progress. I wouldn't be able to do anything till Tuesday so I left my crate in a corner of the airport. I knew since it looked like a casket no one would dare touch it. I intended to send it via air parcel post, which is the cheapest way to send plants to the U.S. It can then be inspected at the port of importation and sent on to your home wherever it may be for the same cost.

When I returned to the post office on Tuesday, I had with me an American whom I had met at the hotel who spoke Spanish fluently. He explained to the postmaster that I had a package to be sent air parcel post. We were told that there was a size limitation. The postmaster pointed to the opening of his counter and said "Whatever fits through there can be shipped; nothing larger." I was dumbstruck; the dimensions were 18" by 18".

I then told my companion to leave me and I would try to handle it from there. At the airport, when I began asking how I could get my plants out, they sent me from one person to the next until finally I was asked the all important question, "Have you seen the Chief Custom Inspector yet?" I said "No." I was promptly told that he would be the only one who could help me now and if I hurried back to town I could catch him since he leaves his post at 3:00 p.m. each day.

the mexican point of view

In a few minutes I found myself entering a dimly lighted room right out of the movie *Casablanca*. Seated at a large desk at the far side of the room

was a handsome man peering at me over the top of horn-rimmed glasses. He was courteous as he began to listen to my story about how I wanted to ship the plants to Miami. He told me, however, that I wouldn't be able to remove them from Mexico. I quickly showed him my U.S. permit. After reading it he inquired as to where my Mexican permit to remove plants from Mexico was.

The ensuing conversation plunged me into a depression, accelerated by the fact that he said it would take three weeks by mail to receive the permit from Mexico City, if I were lucky. At this point I opened my wallet and asked if I could buy one from him.

This angered him and quickly he suggested that I leave the plants for his garden behind his office. I must say

they would have improved the place considerably. When I refused to leave the plants, he said that he would see to it that I got my money back from the plant places in Merida. That, too, was absurd to me. "Then," he said, "I will have to confiscate them."

As I said, "You're kidding," the realization that I was in a foreign country and did not know anyone engulfed me and bang! my eyes filled with tears, which I couldn't control.

Obviously, my accidental tears were the magic thing. Raul Melquizo then said, as he handed me a tissue, that if I would stop crying he would go to the airport with me and see to it that my plants were sent to the U.S. as soon as I wanted them to go.

We then went to his outer office where one of his subordinates was

continued



Pandanus veitchii

checking the list of plants prohibited by law from being removed from the country. Fortunately, I was able to understand enough Spanish to spot that the palms listed as "prohibited" were not the kind I had collected. Those consisted of palms whose leaves were used for fibers and textiles; we found the ornamentals on the approved list.

He whisked me off from his office to the airport in his official car. Now the bureaucracy revved up and things began to happen. Not only was my new friend Raul Melquizo chief of customs, encompassing the east end of Yucatan, but also the head of police and the town's only judge.

As Raul inspected the casket at the airport he said, "You did tell me that you have only cactus didn't you?"

"No, I have . . ."

"You have only cactus," he interrupted. I, of course, agreed.

Within a few minutes, Raul's commands had the owner of the Aereo Mexicana Airlines signing the needed documents. On the application was stamped "Urgente."

With a sigh of relief we left the warehouse.

I thought that was to be the happy ending of a harrowing adventure but in Miami the nightmare began anew. Mac and I arrived there on Saturday and of course the inspection station where the plants had been fumigated on their arrival was closed. Eastern Airlines promised to send them on as soon as they were found. Little did we know that Raul had arranged for them to be at Aereo Mexicana Airlines waiting for us. At the Eastern Airlines office I met a very gracious helpful man who after hearing my problems took all the details down and promised to have them sent to me as soon as he could locate them.

back in philadelphia

Wednesday at noon I heard from Miami that my plants would be at the Eastern Airlines freight depot and that I could have them by 3:00 p.m. When

I arrived there, I sat and waited and waited. No plants. The men who were in charge heard my story and began investigating the whereabouts of my package. Four hours later I was told the crate must have been lost because there was no record of them anywhere and that the only parcel shipped from

"Then," he said, "I will have to confiscate them."

Miami that day via air freight was some chickens.

I left the airport saying that if the plants were not found the airlines would be out a pretty penny.

Thursday at 2:00 p.m. the call I was awaiting so impatiently finally came through. The casket was found and I could get it within the hour. When I arrived at the airport, I was told sheepishly by an agent there that I would not be able to have the plants because the information required by the U.S. Customs had not come with the plants. He then said that he was sure the plants would be in poor condition and advised me just to collect the insurance. I became so angry that he was impelled to pull every string he could. Three hours later my plants were in my wagon and I was on my way home tired and apprehensive about their condition. As I had expected when I opened the crate the palms were horrible. The succulents were the only plants that survived after being planted. The palms didn't have a chance since they were chilled by their wait on some cold platform en route home. Never pack banana pups in plastic, they need air. Forget ferns unless you can box them just before you leave a foreign port and carry them with you. If you arrive at your port of importation during the week you'll have a good chance of having your plants fumigated and inspected while you wait. That's important if you do have ferns and

plants that can't take the abuse of shipment.

If you are going abroad and plan to return with plants, here is a checklist to ease your reentry:

- Before you go abroad write to Agricultural Quarantine Inspection Office at the address given at the beginning of this article.
 - Check with the embassy or consulate of the country you plan to visit to find out about exit permits. Many of them have offices in Philadelphia.
 - To pack and ship plants you will need a hand trowel, a bag for collection, a pruning knife, cotton, plastic bags (various sizes), rubber bands, corrugated boxes that can be assembled at your destination, *Exotica III* handbook to help with botanical and common names. A plant list is necessary for the inspectors because some plants won't survive certain chemical sprays. You must have a complete list on the inside of your package; otherwise, the inspectors will not allow your plants to enter.
 - Indicate which plants are susceptible to specific insecticides.
 - Each package mailed parcel post will need the required permit sticker; don't forget to ask the USDA for them.
- Do all of these things and you can buy with peace of mind. Have a good vacation.

Now a plant consultant with her own business, Millie Gorson Exotics Etc., Ms. Gorson first became interested in plants on a large scale when she went out to buy two plants and came home with a station wagon full. Having studied botany as an undergraduate at Western Reserve University, she extended her studies to the three-year course at the Arboretum of the Barnes Foundation. Ms. Gorson is teaching two 16-week courses on the care and propagation of house plants at the Jewish Youth Center on the Main Line.

bending nature to art



by Edward A. Semanko

Plants should not be included in interior design as an afterthought. The author, an interior architect, selects the appropriate plants and plans for their placement before a nail goes into the wall. They are as important as paintings, graphics, fabric and furniture in their selection and placement. Future plant maintenance costs are evaluated right at the start to determine if the designer's plan is feasible.



photos by Edmund B. Gilchrist, Jr.

The author softened the landscape seen from the master bedroom of a high-rise apartment in center city Philadelphia. Semanko-Bobrowicz designed the mobile triangular planters; they are made from wood with polane finish. The copper troughs set into the planters hold pots at least six inches tall. A special tray for hanging plants has been inserted.

continued



This you must always bear in mind: what is the nature of the whole, and what is my nature, and how this is related to that, and what kind of part it is of what kind of whole; and there is no one who can hinder you from always doing and saying the things which are in accord with the nature of which you are a part.

Marcus Aurelius and His Times

I will start out by assuming that you know all about sun-filled greenhouses, shaded greenhouses, genus, species, plant trauma, water, soil fertilization, hydroponics, insects, disease, humidity, foot candles, temperature, preconditioning, air conditioning, feeding and drainage, planters, guarantees, maintenance, costs, T.L.C. and plant conversation.

Every designer, without exception, when he designs solves a problem or at least he thinks he does. The solution can only be in direct proportion to how clearly he defines the problem. If he refined and distilled his problem well, his solution will probably mirror

the effort, and his design will work for the client. The nature of the designer can add that immeasurable quality called spirit, and that is what we are going to explore. Spirit, as I use the term here, and sensitivity go hand in hand. We have great regard for the environment, and all the parts in which people must work, play, worship and live. A designer's goal is to infuse and to invigorate the inanimate with those qualities that can give flight to the human spirit.

People animate a space, plants invigorate it, paintings stop it and sculpture occupies it.

One of the elements that interior designers are constantly aware of and carefully plan for in all of our projects is the setting for plants and flowers. They are an integral part of the initial planning not only in the visual syntax of the environment but also in the economics of the project on which their life ultimately depends. The economics take into consideration future

maintenance as well as the plant's initial placement. Their importance in the first stage of planning is as much considered as the graphics or prints and paintings for which visual focus, proper wall space and lighting must be coordinated. We must bear in mind that all creative effort is a part of the preliminary planning; it is at that preliminary stage that all elements are orchestrated into a total environment. It is, therefore, extremely difficult in terms of cost and design, in my opinion, to add plants in the masses we do or to create the effect we seek after a space is finished. We never add plants and flowers; they are integrated into that organic whole we call the plan. When a designer faces that blank piece of paper the lines of E. E. Cummings seem so appropriate: *This is the magic moment when it becomes it.* From that point on it's a passionate shaping of character, spirit, economics, organization, and unity.

As the plan evolves we are constantly aware of scale, those proportions that are good for humans, a subtle

At left:

A city garden off the dining room of the same apartment. Semanko created a lush corner in spite of the fact that there's never any direct sunlight in this northern exposure. (Left) Grape ivy lines the dining area; a large fishtail palm (*Caryota plumosa*) screens the window to the right.

The deck, pickets and plant boxes are made from cypress. Special thought must be given to plants atop a 26th floor balcony; wind can easily topple or break material. Ivy, begonia, fuschia, masses of red geraniums, Hawaiian bamboo orchids and a baby macadamia nut tree provide something of a foot-light to the skyline in the foreground. Many of the plants are potted and taken indoors for the winter. The resident plans to plant bulbs in the fall and to cover them with decorative evergreen boughs until the spring.

Below:

These fig trees (*Ficus benjamina*) offer a substantial but nonetheless delicate contrast to the warm dark wood tones and highly polished brass surfaces around them. They also break the space in front of the receptionist's desk in the AID offices (American Institutional Developers). The rectangular insets above the plants are the only lights these plants have been exposed to since they were placed there 18 months ago.

AID's plant maintenance is handled on a weekly basis by The Plant Place in center city.

element of design and difficult to obtain. Scale deals with the relation of elements such as doors, windows, moldings, size of art or sculpture and the size of plants to each other and to the human figure in a given space. We try to keep all elements in the same scale we have been accustomed to seeing. It is not difficult to recall examples of where scale of planting to volume has been violated. I've seen very few trees used indoors that looked comfortable. They seem to need that outdoor ambiance, air and light and scale.

Proportion is largely a matter of the relationship between the size, shape and tone of various parts of a composition. Sculpture to volume, volume to wall, wall to painting, wall to plants, plants to details.

While scale is static, rhythm is organized movement. Appropriate placement of objects moves the eye along the floor and ceiling plane, from surface to surface. The design's visual plasticity gives free and easy motion and direction through a space. It

creates a visual cadence from plant to plant; the rhythmic use of plants delights the eye and draws it to other stopping points, terminated perhaps by paintings.

Plants provide a rhythmic use of line unique to itself. Sculpture can do this to a point but nothing compares to a plant's lines, shaggy silhouette and the decorative aspect of its mass and tracery.

We prefer masses of plants and use them as a compositional focus in our interior architectural projects with the same weight and authority we exercise in distributing other masses architecturally. Using plants on the floor as punctuation marks scattered throughout a particular space seems to dilute their impact. Visually, they contribute to clutter. A well placed healthy vigorous plant mass, modeled with light, can carry quite a visual punch.

People, plants, paintings and sculpture are generally enhanced when the environmental ambient color is close to the white end of the black-white value scale. Plants function extremely

continued



well as transitional elements, for example, between walls and furniture. People animate a space, plants invigorate it, paintings stop it and sculpture occupies it.

Accents of contrast in an off-white environment can be best achieved by plants; they create a different psychological feel than that stimulated by paintings or sculpture. Contrast using plants can be achieved by deep color alone, lighted from above; translucent color, lighted with restraint, from behind; or by silhouette when the background is lighted to a higher intensity than the plant material itself. Plant silhouette can have an etched effect that is magical. Another effect not used often enough, which I find gives great vibrancy to foliage and flowers is translucency.

If you think about it for a minute, foliage in nature usually has some back lighting that contributes immeasurably to the vibrancy of the color that we see. Painters from Vermeer to the present have been trying to capture just that vibrancy on and through objects shown on their canvas. Reflected light contributes its share as

Cezanne discovered, but it's that translucency that makes it dazzling. Take a look at the sunstruck rose windows of the great cathedrals, a medallion of dripping jewels, an effect impossible to achieve in any other way except by translucency.

Splendid shadows can be a fringe benefit by locating plant material adjacent to vertical or horizontal surfaces that reflect long patterned shadows generated by carefully positioned lighting. Shadows, particularly from plants, contribute depth to any setting they occupy. It's impossible to achieve light dappled shadow without plant material, yet how little it is used effectively. Shadows can be projected to the floor, wall or ceiling, and generally the closer your lighting approaches a point source the sharper the shadow.

We use lighting as we would a paint brush; once the artist achieves an effect, the tools are put away. So too, the light that casts a spell should not be seen. The magic is gone when you see the source. We spend a great deal of time and detail hiding light sources. An exception to that is the small brilliant pin points of light given off by a

chandelier or seed lamp source, tiny lights the size of a seed. The effect is similar to the dot of light that the painter will drop on the canvas to draw the viewer's eye. Here again it's that intensity similar to translucency. Low voltage light sources are used where small areas are to be lighted and where heat, size and intensity are the problem.

Tinted light can reinforce color. We use it with restraint. We conceal it, control the light spread and keep the tinted light off all surfaces other than the plants or flowers by the use of optical fixtures if necessary. Different light sources emit different color which can alter local color to a startling degree, making contrast and balance necessary.

Position of plants, as well as light source, plays an important part in their effect. We locate plants below or above eye level. In commercial installations, we fly the plants; that is, they are placed in planters above the eye level. There are several advantages: you don't use valuable floor space and you save electric energy because you are closer to the light source. Silhouette, edge profile, and mass are usually well





At left:
Hardy, heavy textured and broadleaved schefflera (*Schefflera actinophylla*) is in scale with the large room; it works well with the solid furniture. The mass of plants are silhouetted against a window completing the composition of the room.

Above: Wall gardens and file gardens. Cascades of grape ivy (*Cissus rhombifolia*) soften the austere look of banks of files and wall dividing units at the Berwind Corporation at Penn Center Plaza. Plants were incorporated into the original design for the offices; light placement was calculated to benefit the plants. Watering, fertilizing, pruning and replacement of plants is handled by 2601 Parkway Flower Shop; their personnel come to the Berwind offices once a week.

defined against the ceiling plane. We build a lighting fixture into the planter, which casts a light on the ceiling. The light brightens the ceiling, which in turn reflects back on the foliage and creates a translucency. Usually the plant mass stands out in greater relief with the ceiling as a background whereas in many instances a plant mass on the floor is camouflaged by surrounding details and color which blur all of its effective characteristics. You can fly a far greater quantity of plants than you can mount on the floor and for many commercial installations they add a surprising and unsuspected dimension to the environment.

Individual plants used in private areas, whether set on furniture or on the floor, soften the lines of any space but, here again, scale of foliage, spread, texture and outline are carefully considered. We particularly like to rotate plants to suit the season and use masses of fresh flowers within containers whenever possible. The impact of color can be breathtaking particularly on a drab February morning. We tend to shy away from exotic looking material that asserts itself too strongly; we're after a soft blending of all elements, a unified background with the essential spirit and character where living, working and relaxation can take place.

The visual quality plants and flowers evoke may be simply because they are alive and as living things are composed of such infinite detail, color, texture, structure, line, rhythm, pattern, silhouette, mass, movement, and change as to be forever interesting. It may be but for a fleeting, magical moment that they are an opening into the infinite where all the "ifs" are "is." Magic it is and Danish mathematician, poet and philosopher Piet Hein in "The Miracle of Spring" said it this way:

We glibly talk
of nature's laws
but do things have
a natural cause?

Black earth turned into
yellow crocus
is undiluted
hocus-pocus.

Surely Hein meant there's always more
planning and work than meets the eye.

Edward A. Semanko is an architect and partner in the firm Semanko-Bobrowicz. The partners specialize in architecture, interior architecture and graphics. He designed the Philadelphia Flower & Garden Show from 1968 through 1972.

DRAGONS

in chestnut hill



The extraordinary bark of the *Pinus bungeana*.

The lace bark pine is a unique tree. In its native land of China it was called by such fanciful and poetic names as "the twisted dragon pine," "the fairy white pine," and "the tiger skin pine." Such descriptive terminology was inspired by the tree's bark (pure white in maturity), its gently undulating branches, its multi-stemmed trunk, and by a beauty which increased through the ages.

On a sunny day at the Morris Arboretum the "dragon" part of the ancient epithet becomes a bit clearer. Next to the Azalea Meadow, on the perimeter of Japanese Garden II, the crown of the lace bark pine can be singled out. It is a feathery, rounded dome about 40 ft. high, its base obscured by other plantings.

As you walk near it, the graceful habit of the pine becomes evident. Its five or six trunks of varied thickness rise gracefully, somewhat spreading, from a sinuously divided base. And closer still (this dragon won't bite),

one can ponder the bark, a truly exceptional feature of this pine. The bark ranges in color from grey-white through light green, on to dark green and, though not mentioned in the literature on lace bark pine, a brick-red hue.

The bark of the pine exfoliates; that is, it peels off. And though the process is not in itself unique to the lace bark pine, its pattern of exfoliation is. Upper layers of bark peel off in small patches of an irregular, rounded shape. These patches form colorful, asymmetrical patterns that carry all the fascination of an abstract painting. The shed bark exposes a lighter green layer beneath, and it is the varying stages of bark maturity which create the subtle, multi-colored effect.

The needles of the tree grow in bunches of three and are sparsely distributed on the perimeter of the upper branches. This pine and *Pinus gerardiana*, a native of the Himalayas, are the

only three-needled soft pines and together form a distinct grouping.

The delicate foliage allows sunlight to filter liberally through to the branches below. As the splattered sunlight moves gently across the smooth, dappled limbs, its comparison by the ancient Chinese to a living, though mythical, creature seems entirely appropriate.

The oldest specimen of lace bark pine at the Morris Arboretum is nearing 70 years. Age is an important factor in a discussion of this particular pine, for the bark does not reach its full ornamental qualities till at least 50 years of age. Other names from the Chinese deal with this phenomena. "The white pine," "the white bark pine," "the white bone pine" all refer to the chalky, sometimes-glittering bark of the mature tree.

M. E. Weatherill, a long resident of China, notes in the *Journal of the Royal Horticultural Society* in 1934 that the natural life of the tree seems to be about 400 years, and that its prime is reached in about the 250th year. The specimens at the Morris are beginning to display some whiteness, though at this time the effect is quite mottled. The whiteness of the bark is not due to deposits or resins on the surface of the bark, but to the reflection of light from the bark's microscopic cell structures. When a branch dies its cell structures collapse, light is no longer reflected, and the branch appears black.

The characteristic of a luminosity increasing with age made this tree highly prized by the Chinese, especially in their planting of the tomb sites of honored ancestors. Robert Fortune, in his travels in the area of Peking in 1861, observed a pair of pines "of peculiar habit and striking appearance" flanking the tomb of a nobleman. Eight to 10 branches sprang from a



Pinus bungeana near the Rose Garden at Morris Arboretum



MORRIS ARBORETUM

9414 Meadowbrook Ave. • Phila. • Pa. 19118
Ch 7 5777

trunk three to four feet in height, then rose perpendicularly to 80 to 100 ft. The bark of the main stem and branches was milky white and peeling. He notes that throughout India, China and Japan he had never encountered such a tree. Yet examination of the cone structure proved it to be a tree he had seen in Shanghai in a young state and had introduced to England. He goes on to advise those who might have this tree in their collection to watch over it carefully, as it is doubtless hardy in the English clime and will prove a remarkable object in the English landscape.

Pinus bungeana 'Zuccarini,' the scientific name of the lace bark pine, was first described in 1847 by Zuccarini. The specimens used for this description were collected by the Russian botanist, Alexander von Bunge, on his trip to Peking in 1831. Bunge was naturalist to a political delegation sent by Russia to the Peking government in 1830.

For many years it was believed that the lace bark pine existed only in cultivation. It was most frequently found, planted in places of honor and import, in the environs of Peking. (And Peking did later prove to be within its natural range.) Botanical explorations at the turn of the century found the tree growing in a wild state in the provinces to the south and west of the Peking district.

The native whereabouts of the lace bark pine may have been intentionally shrouded by the nursery tradesmen of China. The tree is reputedly very difficult to rear from seed, and its first two years of life are particularly precarious. It is believed that these purveyors of trees retired to the mountains of its native range, obtained seedlings past biennial vulnerability, and established

them in their own nurseries. These plants were sold when they had reached approximately six years of age. This process insured the buyer a tree likely to survive, but also allowed the nurseryman to protect his source—and thereby his monopoly.

Despite the tree's early vulnerability, it is hardy in rather difficult climates. Plant explorer E. H. Wilson found native specimens of the lace bark pine at altitudes of 1000 to 1500 meters, clinging to the thin rocky soil of the mountainsides. And in the area of Peking, where the oldest cultivated specimens of these trees are to be found, winters are harsh, with little rainfall and temperatures to 0°F. Summer temperatures range to 110°F. shade heat. Yet this area fostered the three oldest lace bark pines extant. The "nine dragon pine," so named for its nine stems, has dominated the courtyard of the Chieh-tan-szu monastery for 900 years. Not far away is a tree 300 to 400 years old, in the monastery of Tan-chou-szu. A 700 year old lace bark pine stands at the south entrance of the Winter Palace outside Peking.

And, while we have ranged far afield in our description of the tree's hardiness, the lace bark pine succeeds well in most European countries and the northern United States. A vigorous specimen in Ann Arbor, Michigan, has withstood winters typically much colder than those of Philadelphia.

At the Morris Arboretum, though two large trees have recently been lost through canker disease, three fine specimens remain. Other than the lace bark pine mentioned at the beginning of this article, a 40 to 50 ft. tree stands on the slope behind the Tonkin House. It, too, is approximately 70 years of age but is drawn up taller by the surrounding large trees. Its branches are less undulating but, again, its bark is a magnificent display of abstract shapes and subtle colors.

The young habit of the tree can be seen in the lace bark pine in the Bark Collection (left of the walk proceeding from the Hillcrest entrance). It is approximately 15 ft. high and, one would guess, about 15 years old.

Forester J. W. Wright, writing in the *Morris Arboretum Bulletin* in 1958, recommends this white pine for greater use in city gardens. It is moderately fast growing, in maturity about a foot a year, and quite hardy in thin, well-drained soil. In its early years it has the appearance of a bushy shrub. As a small tree, its form is pyramidal. Wright also says: "Its sparse foliage sheds a very light shade in the shelter of which violets and other semi-shade flowers can thrive and bloom profusely."

Propagating the lace bark pine from seed is touchy business. (We begin to understand the Chinese nurserymen.) Seed germination is very slow, only just beginning 50 to 60 days after planting. Height attained in the first year is barely an inch, and growth remains slow for the first few years.

But the rewards of this tree are great for the few devoted souls who might attempt its nurture. I can think of no tree that is such a gift to time. As landscape architect Peter Shephard pointed out in his recent Barnes Lecture, trees should be planted for future generations. This one is laden with gifts.



by Susan B. Blum

Susan B. Blum is a writer and illustrator on the staff of the Morris Arboretum, as well as associate editor of the Arboretum's *Quarterly Bulletin*. Some of her articles have also appeared in *Frontiers*, the quarterly magazine of the Academy of Natural Sciences.

the ORIENTAL SPRUCE



Among the remaining trees planted at the Tyler Arboretum by Minshall and Jacob Painter over a century ago are two fine oriental spruces (*Picea orientalis*). The larger one, planted in 1860, is below the barn, not far from Rocky Run. It is to the left of the road that turns from the barn down the slope and across Rocky Run. There is a fine view of the tree, which towers over its neighbors, before you go down the slope. On the right, as you turn down the hill, you will see a splendid younger oriental spruce, planted in 1947.

The second tree, planted by Jacob after the death of Minshall in 1874, is a little smaller than the one near Rocky Run. It is close by the stone steps that lead from the northeast side of Lachford Hall down to the spring house. The oriental spruce was introduced to western Europe in 1839, and the Painters did very well to have one by 1860.

Spruces are trees from cool heights and of the Northland and often do not

thrive into old age in the climate of Delaware County. But these two trees have weathered their first hundred years very well, the only survivors of the seven species of spruce planted by the Painters. Two Norway spruces survived until 1955, but have since been lost in storms

The larger of our trees is the champion of its kind in the Philadelphia area for size, over 100 feet in height, with a girth at four feet of eight feet eight inches.

The oriental spruce is widespread in Asia Minor, the Caucasus and Armenia, growing at elevations of 2,500 to 7,500 feet, and in the Caucasus reaching the noble height of 180 feet, with a trunk circumference of 12 feet. The larger of our trees is the champion of its kind in the Philadelphia area for size, over 100 feet in height, with a girth at four feet of eight feet eight inches. Its sister is also large, with a smaller girth, but a height stretching well toward the hundred-foot mark.

The oriental spruce is a neat and shapely tree. Its fine, dark green, shining needles are only a quarter to a half-inch long, giving the tree a fine texture. These, combined with the graceful branching, dense pyramidal habit and the adaptability to this climate, give us one of our best spruces.

If you cross the bridge over Rocky Run and continue up the hill, you will see on your left a group of four young oriental spruces. The one nearest the road began to bear cones several years ago, and they are low enough to be

easily seen. They are purple when young, narrow and tapering, three to four inches long.

A century ago hundreds of thousands of spruces were planted throughout the northeastern and north central states. They were Norway spruces, imported from Europe at a very low price. Many of these old spruces are still to be seen in suburbs and around farm houses. In the early decades of the twentieth century the Colorado spruce, especially its blue forms, became all the rage. Young trees are handsome, but in time they succumb to ailments that beset them in the eastern states, so different from their mountain home. Spruces in their natural forms are now not much planted in this area as ornamentals, although dwarf and bizarre forms are enjoying popularity. It is in an arboretum such as Tyler that several species can be given the room to grow for the enjoyment of visitors now and in the future.

Of the spruces grown by the Painters we now have young specimens of the west Himalayan spruce (*Picea smithiana*) and the Norway spruce (*P. abies*). Three others they grew, *P. glauca*, *P. rubens* and *P. mariana*, though natives of the eastern states, do not thrive here; we shall probably never plant them. However, we have several other species: the Colorado spruce (*P. pungens*) and the Englemann spruce (*P. engelmanni*) which may not live through their first century here, *Picea asperata*, the Chinese counterpart of the Norway spruce, and, most interesting, the Serbian spruce (*Picea omorika*).

If you continue up the hill you will pass other spruces, and come finally, up near the sequoia, to a group of Serbian spruces. They are so distinct-



THE
TYLER ARBORETUM

515 Painter Road • Lima • PA 19060
L 6 5431

tive they cannot be missed. They are narrow, with branches that sweep down but turn up at the ends. There is a striking contrast between the glossy green lower surface of the leaves and the silvery upper surface. Those who are lucky enough to have room for spruces would do well to seek out the Serbian and oriental spruces.

Crossing the open area of the pinetum from the Serbian spruces toward the rhododendron area brings you to a group of three handsome dwarf Alberta spruces (*P. glauca conica*). Dense dwarf spruces such as these need extra care to keep them in good health, especially in our climate. Old needles, when they drop, tend to accumulate in the branches. Red spider is a problem. The old needles and debris should be cleaned out once or twice a year. A good spray of cold water from the hose, reaching well into the interior, will wash away a good bit of red spider. The home gardener should be able to do this fairly frequently. From time to time a spray of a miticide will be beneficial.

There are a number of other dwarf varieties of spruce near the buildings at Tyler, and how well all these will endure the climate here only time will tell. In the meantime, they are worth a visit. Look for them especially near the Stone House.



by Gertrude S. Wister

This tree is one of the oriental spruces planted at Tyler in the 19th century by the Painters. It is at least 100 years old.

PERIODICALS: keeping up with changes

There is nothing new in gardening or so you might think after reading an 18th century treatise on garden practices and comparing it to a book published today. It is true that the requirements for plants grown in a 14th century monastery garden remain the same as those of our own garden plants.

While the basics remain the same, innovations in techniques and design, new plant introductions, changes in disease and pest control and many other aspects of horticulture are constantly evolving.

The best sources of updated information are periodicals. Most of us subscribe to at least one gardening magazine. To keep up with the stacks of information that are written about gardening, the PHS Library subscribes to more than 225 periodicals, a heavy load for anyone's coffee table! The journals, magazines, bulletins and newsletters received in the library represent most of the horticultural institutions in the United States. Twelve journals come from abroad. The library gets all this material through membership in organizations, exchange of publications or outright subscription.

Part of the library staff's responsibility is to sift through the journals and to pass on to other staff members or the horticultural files, information that will help answer questions or keep us a little bit ahead of our member's interests.

The periodicals represent roughly five areas of horticulture: scientific research, trade organizations, popular gardening, plant societies and other horticultural societies. Even though there is a great deal of subject repetition, the mere fact that some bit of information is expressed a little differently may give the casual reader or serious researcher a new insight into an old idea. Think how many times you've read articles on pruning or vegetable gardening or lawns but found something each time you hadn't thought of before. Hundreds of these journals are used each year in the library by lunchtime browsers, authors, and students doing topical research.

The library binds 185 of the titles, maintaining them in an ongoing collection. For the historian we maintain long runs of many defunct titles such as *Meehan's Monthly* published here in

Philadelphia until 1902. We are one of the few libraries in America that has a complete run of *Curtis's Botanical Magazine*, first published in 1787. Still in publication, *Curtis* is part of our rare book collection.

The publications of each of the major plant societies are on our shelves. Our members' interests reflect, somewhat, the strength or size of the collection in a certain field. There are five bonsai periodicals and several bonsai newsletters in the library. *The Bonsai Journal* of the American Bonsai Society is the publication on bonsai most referred to by our readers. Among others the library subscribes to *Bonsai World*, worth noting for its photographs only, unless you are fluent in Japanese. A recent issue of the *Journal* features an article on companion planting for bonsai, a topic too specific for most books on bonsai, yet one that enhances the practice of the art.

Rock garden enthusiasts not only use the *American Rock Garden Society Bulletin* but journals and newsletters from Scotland, England and British Columbia. Related societies of interest to the rock gardener such as the Ameri-

Halprin, famous for his attempts to humanize the environment, undertook a revolutionary, non-hierarchical approach to encourage fully the collective creative efforts of his staff, making a clear distinction between that design approach and the "team-work approach." Such an article should be assigned to all students in the field.

can Fern Society and the American Primrose Society have journals in our collection. Through the *ARGS Bulletin*, members teach each other new techniques, write about collecting trips and garden tours, exchange seed not available commercially and ask questions.

Orchid fanciers will find four publications. One, *Die Orchideen*, comes from Germany.

As I stand looking at the collection, I can spot at least 40 journals from societies and groups that represent most of the major plant growing inter-

ests. From succulents to geraniums through lilies to nuts they are all here for anyone to read.

Trade organization publications keep us informed about new commercial introductions whether plant or product. *The American Nurseryman* is up front on trees and pollution, on disease and pest research and other timely topics. *Grounds Maintenance*, *Golf Superintendent* and *Weeds, Trees and Turf* are good references for turf management and the latest in gardening machinery. *The American Fruit Grower* and *The American Vegetable Grower* are aimed at the commercial growers with the latest crop management news. *The Gardener's Chronicle* from England keeps the American grower in touch with the trade in Britain. The *Chronicle* is an old, ongoing publication and the library has been a subscriber since 1841.

Horticultural societies and other horticultural groups in most parts of the country are represented collectively in the library by 50 periodicals and endless newsletters. Publications from other horticultural societies are a help in program planning. Their articles often are of regional interest and let us know what's going on in other areas of our field. One of the best, *Garden Journal*, from the New York Botanical Garden offers varied information. A recent issue contains an article on modern plant exploration, the story of an overlooked native perennial, *Stokesia laevis*, and an updated report of their Garden Crafters program, the children's summer gardens project that has been a model for many programs of its kind.

Most of us are familiar with The Brooklyn Botanic Garden's handbooks. These handbooks are issued first as the *Plants and Gardens*, the BBG's publication for members.

Flower arrangers have *Ikebana International*, a publication printed in English in Japan, dedicated to the art of Japanese flower arranging.

The American Society of Landscape Architects publishes *Landscape Architecture*, a journal for the professional. I often rely on the magazine's book reviews for new publications in the field as well as articles on new design directions that are helpful to our members. The April 1974 issue carried a long but fascinating and poignant article about



photo by Edmund B. Gilchrist, Jr.

a radical experiment in management by the small, but well-known landscape architecture firm of Lawrence Halprin. Halprin, famous for his attempts to humanize the environment, undertook a revolutionary, nonhierarchical approach to encourage fully the collective creative efforts of his staff, making a clear distinction between that design approach and the "teamwork approach." Such an article should be assigned to all students in the field.

Scientific journals are an important part of our collection. Research in horticulture is documented in such publications and the material is on our shelves for the serious reader or student. Professional horticulturists and the serious amateur concerned with plant propagation often use the *Plant Propagator*, the journal of the International Plant Propagator's Society. A recent number contained a detailed report on the propagation of the Douglas fir. The serious pomologist may use *Fruit Vari-*

eties Journal of the American Pomological Society. Both the British and American Societies for Horticultural Science are represented by their publications. The reference journal for journals and articles, *Horticultural Abstracts*, is used as a reference tool for horticultural research.

Popular gardening magazines are sprouting like dandelions after a wind storm. *Flower and Garden* continues as the reliable stand-by with timely and relevant articles. Two fairly new publications are hardly ever in place on their shelves. *Plants Alive* scoots around the office and I'm always having to track it down. A lively magazine devoted to house and greenhouse plants, *Plants Alive* joined the container revolution in a recent article on container vegetables. The periodical for the gardener who reads on the run is *Avant Gardener*. A digest in an attractive newsletter format, the *Avant Gardener* covers an amazing amount of topics in

each issue. It is published twice a month and we all look forward to each issue. Volume 6, No. 4, covered 13 topics from vertical gardens to recycling used pots. Sources, references and timely tips are sprinkled throughout each issue. Where else could you learn that, "A cherry tree has been planted at the birth of every child in the village of Ciresoia in northern Roumania for hundreds of years, and now there are 65,000 cherry trees in and around the town." Just think what that could do for our 10,000 trees program!

Whether you want to know the latest in light gardening techniques found in *Light Garden*, the magazine of the Indoor Light Gardening Society of America, affectionately known as ILGSA, or you want to read about *Cyclamen coum* in *Curtis's Botanical Magazine*, Volume I, 1787, or you just want to browse, take a long lunch hour sometime and visit the periodical section of the library.



Noreen McCoy is a horticulturist and coordinator of membership activities at PHS.

drawing by Julie Baxendell

paper white narcissus

The Paper White Grandiflora, the Snowy White Narcissus and Soleil d'Or (the golden variety) are some of the most interesting bulbs that I force every winter. What a pleasure it is when the days are long and dark to have a bowl of these fragrant flowers in the living room. My friends enjoy watching the stems elongate and the buds burst open; they remind us that spring is on the way.

Top sized bulbs should be purchased early in the fall and I store mine in the vegetable tray of my refrigerator (however, don't forget to remind the family that they are not onions in the bottom tray). When buying them, don't forget to plan for extras to plant in a small lovely bowl or casserole for a Thanksgiving or Christmas gift.

I plant the bulbs on the top of pebbles in clean containers that are deep enough to allow for a good root system, about two inches or more. The bulbs can then stand firm and be well anchored. A small piece of charcoal can be added but I really do not find this necessary. I recommend an uneven number of bulbs for aesthetics; they can be placed quite close together so the planting will not look skimpy.

After the bulbs are in place on the surface of the pebbles, fill the bowl up to a half inch of the base of the bulbs with lukewarm water. The water will soon evaporate; keep the water level just at the base of the bulbs.

To encourage root growth the bowls should be stored in a cool, dark and well ventilated place. A cool cellar is perfect but a modern refrigerator that has good air circulation has worked well for me.

Bulbs started early in the fall take longer to root and according to Charles H. Mueller, the bulb specialist from New Hope, Pa., this rooting period varies from three weeks for bulbs planted in October through December to ten days for those started in February. You will have to check often to see if the bulbs are firmly held down in the pebbles and that the water supply is kept level. If the root growth is sufficient the bulbs can gradually be brought into bright light until the foliage turns bright green. Then, give sunlight to promote quick growth and thus avoid a "leggy" look to the plants. When the Paper Whites are in bloom, move them away from the sunlight and find a cool spot with an even temperature to help the blooms last for you as long as possible, turning the bowl every day.

You may have a week or more of bloom in the house but in a cool greenhouse planted in soil mix, I have had blooms last for more than three weeks.

Paper Whites are especially precooled for forcing, and will not bloom again for you in the garden, so once the flowers have faded just throw the bulbs away. Do not feel too badly; they have rewarded you well.

Noreen McCoy

streptocarpus 'constant nymph'

To see a *Streptocarpus* 'Constant Nymph' in full bloom is to covet it. These floriferous charmers of the gesneriad family hail from Cape Province, South Africa, hence the common name, cape primrose. Growing them requires special care, but the rewards are good.

If you plan to grow under lights, propagation can be from seed or wedge cuttings. Make several 1½ in. wedges from the long strap leaves. Insert them ½ in. in the propagating mix (1 part water to 7 parts vermiculite is just the right amount of moisture), and keep them warm and humid. Domed plastic breadboxes are good for this purpose. If the house is cool, set them on a soil heating cable to insure steady warmth. When a sufficient root system develops and the first plantlets appear, pot them in a soilless mixture of equal parts peat, vermiculite and perlite adding per quart of mix a tbsp. ground lime and one tbsp. mag-amp fertilizer (7-40-6) or equivalent of superphosphate. Fertilize with a very weak solution of all-purpose fertilizer (Peters 20-19-18) or any other balanced one every time you water. Once a month flush out the pot with just plain water. The trick with these plants is to keep them cool and to plant them high. They are susceptible to crown rot so plant them ½ in. above the soil surface.

Keep them about 15 in. from the fluorescent tubes and in a well ventilated spot; they do not enjoy a lot of heat. Temperatures ranging 65° - 75° are preferable.

The plants do very well in an east window or a comparable amount of light. I like them in hanging baskets where their long strap leaves have plenty of room. If a leaf looks ratty, trim it down; if it's just too long, use it for propagation, but make sure it's a good sturdy leaf. Once these plants flower they continue for three or four months or even longer.

The *Streptocarpus* 'Weismoor' and *Rexi* varieties have a larger color range including whites, the rose to reds and all the blues, while the 'Constant Nymph' runs from light to dark blue. Now Maasens 'White Nymph' is coming on the market and it is the



Libby Stephenson wrote about her exceptional indoor light garden in the Nov. 1973 *Green Scene*.

most beautiful of all. But for constant bloom stay with the 'Constant Nymph.' We are very fortunate now to have a commercial grower in our area who is producing this plant. He is Gary K. Hunter, Grower, Hunters Greenhouses and Berry Farm, R.D. 1, Box 2A, Drumore, Pa. 17518; greenhouse phone (717) 786-7896 (Quarryville, Pa.), farm phone (717) 548-2889.

Libby Stephenson

begonia sutherlandi

This charming begonia is tuberous and is completely dormant all winter. It is native to Natal, whence it was introduced to England in 1862 by a Dr. Sutherland. I grow it on a high, shady wall, where it blooms continuously all summer.

Begonia sutherlandi might be called a "hanging basket" begonia because of its graceful drooping habit. The leaves are a pale green, almost translucent, with red veins and margins. The small flowers are soft orange; there are four or five at the end of each red stem.

In his book, *Successful Begonia Culture*, Frederick Bedson, the English authority on begonias, tells an amusing story about *B. sutherlandi*:

"Bailey, in *Hortus Second*, describes the species under the name of *B. Schnitzeri*. A famous American horticulturist visiting England told me that this name was a joke on our botanists, as it was thus named by an American who 'snatched' it from a fellow collector, so labeled it, and thus passed the name into the records."

B. sutherlandi is quite susceptible to mildew, but it can be easily controlled with benomyl.

When cold weather brings on dormancy, I store the pot with the tubers still in place, in a cold corner of my cellar. In early April, they begin to push forth tiny sprouts, at which point I move the pot to a sunny windowsill. You can leave *B. sutherlandi* in the same pot for three or four years. Or you can repot and divide it more frequently thus obtaining a number of new plants. However, the surest way to propagate is by the leaf bulbils that appear in great profusion.

Ernesta D. Ballard



photo by Merry Gardens, Camden, Maine

PHS president Ernesta D. Ballard's principal horticultural interest has been growing plants in containers.

classified ads

WANTED: GARDENER-CARETAKER for Estate in Delaware. Experience in lawns and shrubs with farming background. Married but no young children. Wife to help care for two children. Three bedroom house on grounds available. Send resume with references. Reply to: Box H.R., Montchanin, DE 19710.

J. FRANKLIN STYER NURSERIES

"The Original Styer"

Visit our "Yule Tree Shop" open November 1st.

Fantastic display of Christmas decorations from countries around the world.

Custom-made and decorated wreaths and evergreen decoration. Our experts will decorate your home, office or entire building.

For the most unusual gift, give for Christmas one of our distinctive terrarium gardens: *A Landscape in Miniature* especially made to your specifications.

Don't forget our live and cut Christmas trees.

J. Franklin Styer Nurseries

U.S. Route 1, Concordville, Pa. GL 9-2400

ORCHID AUCTION. Southeastern Pennsylvania Orchid Society will hold annual auction Wednesday, November 13, at 8:00 p.m. in Auditorium of Nurses' Home of Bryn Mawr Hospital. Good opportunity to get quality orchid plants. Information: MI 2-0878.

AFRICAN VIOLETS—America's finest, including amazing Rhapsodies, plus scores of other varieties. Send for color catalog, 15¢. Illustrated Growing Aids Catalog, 25¢. **FISCHER GREENHOUSES**, Dept. PH, Linwood, NJ 08221.

November 15, 2:00 p.m. Lecture by Adelma Simmons, Herbalist, on "Herb Gardens, How to Grow and Use Them." At Cumberland County Historical Society's Annual Antique Show and Sale. Glass Museum, Wheaton Village, Millville, New Jersey.

FERN HILL FARM DR. MARTIN POLE LIMA BEAN SEED. Certified True to Type and Germination Tested by New Jersey Department of Agriculture. Hand selected seed available from Fern Hill Farm, Jessup Mill Road, Clarksboro, NJ 08020, at \$1.00/pkt. (12 seeds) + 50¢ postage per order.

Horticultural Consultant Service. I have a BS degree in Horticulture from Penn State, with a 30-year background in the field of Horticulture and general Landscaping. I can help solve any problems or go over your property and make recommendations that could prevent problems.

Naturalistic to formal settings, plants and plant problems, site preparation and grading problems. Consulting done on a fee basis. Hugh J. Peeling, P.O. Box 5, Concordville, PA 19331. Phone (215) GL 9-3192.

LORD AND BURNHAM GREENHOUSES for the care, cultivation and protection of tender growing plants; painstakingly custom designed to your specific horticultural needs, flawlessly erected, and delivered on time every time. Inquiry welcome. **OED, INC.**, Villanova, PA. 688-4825.

Hundreds of satisfied green tenants... From the plant people who build greenhouses... Not builders who are green about plants.

Wanted Customers for superior varieties such as: *Acer rubrum*, *Cercidophyllum japonicum*, *Cryptomeria japonica*, *Enkianthus campanulata*, *Hydrangea quercifolia*, *Ilex glabra compacta*, *Ilex 'Nellie Stevens'*, *Juniperus chinensis sargent*, *Pinus densiflora umbraculifera*, *Stewartia pseudo-camelia*, *Styrax obassia*. All, and more available from Rose Valley Nurseries, 684 S New Middletown Rd, Media, Pa 19063 Telephone Ben Palmer, TR 2 7206

Advertising copy should be submitted 8 weeks before issue date: November, January, March, May, July, September. Minimum rate \$5.50 (covers up to 35 words). Additional words 20¢ each. Less 10% discount for two or more consecutive issues, using same copy. All copy should be accompanied by check made out to **PENNSYLVANIA HORTICULTURAL SOCIETY** and sent to Patricia M. Cain, **THE GREEN SCENE**, 325 Walnut Street, Philadelphia, PA 19106.



Ficus benjamina is an integral part of the reception area's ambience at American Institutional Developers' offices in Philadelphia.

THE
**green
scene**

HORTICULTURE IN THE DELAWARE VALLEY

\$1.00

JANUARY • FEBRUARY • 1975



Wildflowers from the
Pine Barrens.

See story on page 8.



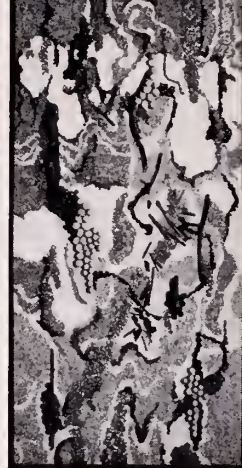
8



2



30



18



13



THE green scene

HORTICULTURE IN THE DELAWARE VALLEY

Volume 3, Number 3 Jan./Feb. 1975

published by
THE PENNSYLVANIA
HORTICULTURAL SOCIETY
325 Walnut Street, Philadelphia, Pa. 19106

Ernesta D. Ballard/*President*
Jean Byrne/*Editor*

PUBLICATIONS COMMITTEE

Craig S. Oliver/*Chairman*

George M. Harding
Nancy Howard
Robert S. Ryan
J. Franklin Styer
Dorothy Young

Patricia M. Cain/*Classified Advertising*
/Retail Distribution

Designer

Julie Baxendell
Baxendell Design Associates

THE GREEN SCENE, Volume 3, No. 3, published bimonthly, January, March, May, July, September, November, by the Pennsylvania Horticultural Society, a non-profit membership organization at 325 Walnut Street, Philadelphia, Pa. 19106. Subscription: \$5.00 — Single Copy: \$1.00. Second class postage paid at Philadelphia, Pa. 19104.

POSTMASTER: Send Form No. 3579 to THE GREEN SCENE, 325 Walnut Street, Philadelphia, Pa. 19106.

© Pennsylvania Horticultural Society, 1975

in this issue

- 1 Guest Editorial by *J. Franklin Styer*
- 2 Vista Enhancement Through Progressive Realization by *Darrel Apps*
- 8 Woodland? ... Not a Woodland ... A 7 Foot Terrarium by *William C. Judd*
- 13 Espalier: For Ornamentation and Fruit by *L. Wilbur Zimmerman*
- 18 Four Unusual Seed Mosaics by *Priscilla-Gene W. Shaffer*
- 22 Books and the Green World: A Very Special Collection by *Julie Morris*
- 25 The Morris Arboretum: Some Grand Conifers by *Susan B. Blum*
- 28 The Tyler Arboretum: A Cedar in Lebanon with Fair Branches, and with a Shadowing Shroud by *Gertrude S. Wister*
- 30 The Rake's Progress at Crefeld Street: Cleanup Time with a Little Help from the Broom by *Patricia Steijn*
- 32 Growing Interests
- 32 Classified Advertising

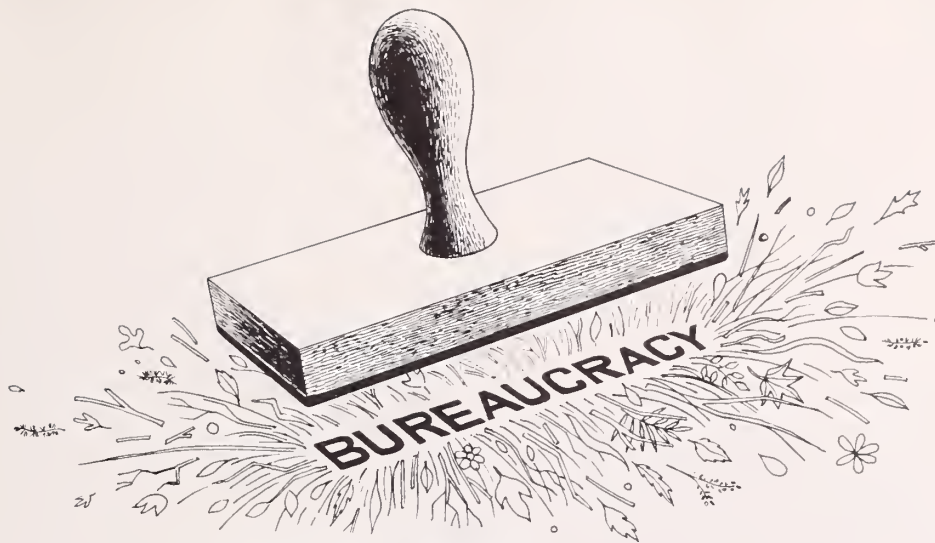
Covers:

Nurseryman William C. Judd hunts wild flowers on the weekends with his camera. The plants photographed here have been successfully grown in Judd's 7 ft. terrarium. See story on page 8.

Front cover: *Sarracenia purpurea*, pitcher plant.

Back cover: *Chimaphila maculata*, pipsissewa.

(Photos by William C. Judd.)



ornamentals expendable?

As times change we need to reconsider the fitness of certain words that may no longer convey the same old meaning. We also want to convey new ideas and need new words for the purpose. For decades most nurserymen have described most of their stock as ornamentals, until even the dictionaries list plants as the commonest meaning of the word "ornamentals." And now we find ourselves well out on an etymological limb.

"Ornamental" was once only an adjective, but by a common English custom it was turned into a noun, just as the adjective Chinese became the Chinese, as a language, or the Chinese, as a people. Or as the adjective "oriental" became the noun, an Oriental. Hence the term "ornamental" is applied generally without the word "plants."

You ask "What can be wrong with this?" We argue that the term "ornamental" is frivolous; it minimizes the importance of plants in general; it threatens the very life of species which are less than artistically decorative; it stigmatizes most of our plants as mere playthings. And above all it threatens the business priorities of the growers of practically all woody material.

The danger to the nurseryman is far from imaginary. There may be restrictions on his use of land, labor, fertilizer, water, utilities. The basis of all such restriction would be that his business is not essential. The use of any term that supports such a contention needs to be corrected.

We have scarcely seen the first wave of the coming tide of controls. The environmental problem is becoming more than a simple attack on certain forms of pollution such as insecticides. We shall soon see experts in all fields of science proposing controls of things they consider expendable. They will forget the eagles, abandon the ducks, and kill off the pigeons. They will attack luxury in general and will try to hold all basic resources for energy production, with food production a poor second. If you will look into the water allocation programs already set up in your own state you will probably be shocked to find the control of water is detailed to the last gallon—how much are **you** to get?

The nurseryman's obvious and only answer to this is that every plant he grows, whether it be ornamental or not, falls clearly into the category of energy and substance producers. In home lots and gardens as well as in cornfield or forest, green leaves produce sugar, sugar which makes all the paper, all the wood, and most of the fiber we use. The leaves reduce the air temperature, filter out pollutants, temper the winds, turn loose oxygen, and in the long run do more than any other thing to make our environment livable. And at the same time, the roots enrich the soil on which we all depend.

From this point of view the beauty of a plant or the aesthetic value of a plant arrangement becomes only an extra dividend resulting from our skill in doing the fundamental thing—keeping the land green.

For these reasons, and in view of the battle now shaping up, the term "ornamentals" has had its day; bury it under the next transplanted tree. Instead, when asked what we grow, let us say, "Environmentals."


by J. Franklin Styer

J. Franklin Styer has been in the nursery business for more than 50 years. Recently, he was appointed by the county commissioner to the Board of the Delaware County Conservation District. The Board is charged with arranging studies measuring the environmental impact of changes and of drawing up plans to minimize injury to plant and water supplies. This is Styer's second appearance on the guest editorial page. See his excellent argument for better use of nomenclature (March '74 *Green Scene*).

This attractive house is almost hidden from the street. Because of the property size the concept of progressive realization can be perceived from an automobile as you enter the front parking area. A double hedge provides strong horizontal lines which help reduce the apparent height. These hedges also present considerable interest to the guest as he or she approaches the front door. Although the trees are still small, eventually they will hide a larger portion of the house and further add to the progressive realization concept.



VISTA ENHANCEMENT THROUGH PROGRESSIVE REALIZATION OR TAKING IN THE SCENE GRADUALLY

 by Darrel Apps

Darrel Apps is associate professor of horticulture at Pennsylvania State University, where he teaches courses in nursery management and garden center operations. He is the author of many university publications on landscape design and gardening.

photos by author

As an ornamental horticulturist my job at Penn State is to reach courses in nursery management and garden center operations. But, if you were to visit my class early in the term, you might think you were in the wrong room.

Usually my first couple of lectures center on the functions plants perform in the landscape. Often I use two projectors and show slides with a concept on one screen and an example on the other. It is not my intention in that brief period to attempt to make designers out of these students, but rather to create within them a new sensitivity. I believe that if they know the ultimate architectural uses of plants, logically they will be better commercial growers and retailers. In fact, in the first couple of lectures I strongly encourage the students to enroll in landscape architecture courses, even if it's for no other reason than to be able to communicate better with the professionals from that discipline.

continued

A patio below a deck becomes a viewing station for this family. The path leads the eye to other areas of the landscape although you are given no clue as to what the areas might be like. Purposely sunken, the patio is a relief area to give contrast to the unusual collection of plants in the rock garden.



The progressive realization concept starts at the home's entrance. This contemporary house uses soil berms to guide the guest and to build up curiosity. The height of the soil berms appear enlarged because of the multiple stemmed deciduous holly plants used at the apex. Although the ground plane plants are variable, a mass effect is obtained mainly from heavy use of pachysandra.





Paths provide effective ways to build curiosity and imagination into a backyard plan. Although plants are generally considered negative elements to form foreground, background and direction, in this example the strong character of individual plants is used effectively as the terminus of some of the views.

The Concept

One concept I touch upon in my lectures and will expand on here is progressive realization. Another way to say the same thing is "the gradual unfolding of a view." John Ormsbee Simonds in his book, *Landscape Architecture*, describes the concept eloquently: "A view should be totally revealed in its fullest impact only from that position in the plan where it is most desirable. It is not to be wasted in one first blast, but it is to be conserved and displayed with perhaps more refinement but certainly with no less feeling for suspense and timing than shown by the striptease artist."

View and Vista

The concept of progressive realization presumes there is a view or terminal object in the landscape. Think of some of the subdivisions and homes you are familiar with. How many have positive views? In Centre County, Pennsylvania, my present home area, several subdivisions were designed to capture the majestic view of Mt. Nittany. Actually, however, only a few people get a good view. In a majority of residences a look through a back window is a view of someone

else's house and often the least attractive part or parts of that house. For these individuals a vista needs to be created in its entirety.

What is a view? What is a vista? Landscape designers distinguish between the two. A view is a scene or a prospect observed from a particular vantage point. Whereas, a vista by definition is more limited. It is a confined view, an enframed segment. Vistas can be natural or totally created. The three essential elements of all vistas are a viewing point or station, an object or objects to be seen and the intermediate ground. Most effective home landscapes take these three elements into consideration in order to create interesting vistas from various vantage points.

Developing the Vista

What are the most important vantage points or viewing stations? Of course they are different for every residence, but there is a general consensus that landscaping philosophy today has changed drastically from the mansion construction period of the antebellum South. The historic Federal Period homes were often designed as the terminus of the vista itself. People

stood at the front and were awed by the tree enframed architecture.

Today design conscious homeowners would be appalled if they looked out their window and met the eyes of someone staring in. With few exceptions most suburban homeowners seek privacy. Home sites are chosen so that they are isolated from street view. If a house is purchased without surrounding vegetation most landscape designers would be quick to recognize the need to create privacy from the street. Essentially, today's creative designers talk about viewing stations from the house outward. Perhaps the ecology movement has further enhanced this indoor-outdoor idea.

If there is an exception to "the home as a viewing station rule" it is the entrance garden designed to give guests a feeling of curiosity while they are directed to the front door. Unfortunately, the foundation planting concept lingers on, but it does little to enhance a vista from indoors to the outside. For that matter most foundation plantings do little for anyone including those who sell plants commercially. By contrast the entrance garden sets a mood of great design

continued

The imposed ceiling in this landscape effectively directs the eye downward and ties elements together. New residences or industrial grounds often profit by using man-made ceilings to capture space and make it more imaginative.



sensitivity and it is here that a visitor can first experience (probably unknowingly) the concept, progressive realization.

In developing the concept the entrance door will likely not be in full view. In fact, a good designer can indicate through construction and plant materials that a person will come to the residence entrance without the slightest glimpse of the door. That represents progressive realization, knowing or seeing that an object is there but providing an intermediate area between vista station and the terminal object with a hint of mystery as to what the entrance will really be like on arrival.

Naturally, plants will help form some of the various architectural functions along the path. Some will be used for textural variations along with ground plane construction. A small hedge, knee high, may help direct both the eye and traffic. A waist high grouping of shrubs may cut down short cuts of regular service personnel. Shoulder

high plants will be used much like the wall of a room to confine space and stop it from leaking. And finally, shade trees might make up a partially enclosed ceiling. Does this sound interesting? When I ask this question I'm always afraid someone will respond with the thought that this planting might provide a good place for a mugging. Well it could be such a place, but outdoor night lighting can be used both for safety and to present quite another vista during the evening hours. Certainly this entrance planting is not static. Each season should make for change. A clever designer needs to install needle and broadleaf evergreens in goodly proportions to insure that the progressive realization concept stands up all winter.

Another important viewing station from many homes is a dining or family room window. To give an extension of space from indoors to out, design a small outdoor room adjacent to the window. Plant trees or shrubs close enough to the window such that you

are forced to look through them. This adds depth of field much like branches are used to frame pictures. From this outdoor room a path might lead to still other room-like areas. The path entrance and its very presence can create still further curiosity and excitement.

Sound and Smell Can Be Used To Enhance a Vista

So far I have written entirely about seeing as the sole means of perceiving. However, the senses of sound and smell may also be integrated into the progressive realization concept. Imagine being led closer and closer to sweet autumn clematis by progressively stronger and stronger doses of the fragrance. Or, suppose it is a 90° day and you can hear the rustling cooling effect of aspen leaves but can't see them. Probably falling water is the most classic example of sound perception in landscapes and indeed a useful technique for great excitement and curiosity.

Beware of a Botanical Zoo

One further point, plant materials used to create the progressive realization concept are considered negative components. They are used to form foreground, background or frames for activities or views. Whether we like it or not the lines, forms, textures and colors of plants are seldom consciously seen or noticed by most people. This is because the average viewer's eye is in constant motion envisioning changing views as he moves. Generally, a person views whole scenes and pays little attention to detail unless that person has been specially trained. As plant lovers and horticulturists be cognizant of this "total vista versus individual plant principle" and be careful not to use too many different plants or your home could become a focal point in a botanical zoo.





This outdoor room has been separated from surrounding space with imagination. Dissecting lines on the ground plane make the surface appear more intimate and relate better to human scale. The walls of the room are transitional rather than abrupt—the planting strip supplies considerable form and textural interest. Brick pillars match the knee-high wall and together with the louvered fence provide a most pleasing background. To the left, but not visible in the picture, is a gate that leads you to other parts of the residential landscape. The patio room from one vantage point in the landscape is a terminal view, yet at other times it acts as a viewing station.



The use of a gate is an effective technique to help build a feeling of curiosity. In this scene the near white stepping stones guide the eye. Ajuga and Andorra juniper provide textural contrast as one walks the path. The mariesi selection of doublefile viburnum helps divide space and partially screens the oncoming view.

The swamp saxifrage is almost nudged into the pool by the host of white violets behind it. A venus fly trap in the foreground works without interference. Mosses and ferns stir slightly as a newt scurries beneath the log. All of this activity contained in a 7 ft. plot? Without benefit of the sun? A quiet, faint hum provides a slight clue to the location of this unusual environment.



WOODLAND?...



NOT A WOODLAND...



A three-track storm door is used to enclose the top of the terrarium. On track, a screen permits air to circulate when necessary. Unlike the usual terrarium, this one can't be kept closed all of the time since fungus occasionally forms. The screen is necessary to keep in the insects that hatch in the summer as well as the other animals that inhabit the terrarium.

Visitors to the Philadelphia Flower & Garden Show are familiar with Bill Judd's marvelous exhibits. They have been prizewinners all: Winter Scene in '72; Builders of the Pine Barrens '73 and Mountain Glen in '74. Judd is proprietor of Judd's Hollylan Nurseries in Pitman, New Jersey, which specializes in hollies.

photos by Edmund B. Gilchrist, Jr.

a 7 foot terrarium

I have a passion for wild flowers, particularly those native to the Pine Barrens. Fortunately, I have a friend who owns 10,000 acres in that area, and it's there that I photograph my favorites and gather many of the plants for the 7 ft. terrarium in my living room.

People have asked me why I planned such a large terrarium. I can only say that I happen to like things on a large scale. When you enjoy working big, it's impossible to settle for a terrarium made from a brandy snifter or a candy jar.

Actually, I never started out to do the terrarium in any specific way; it evolved to its present swamp and meadow microclimates. Originally the terrain was flat, but I just kept adding interesting logs and rocks as I went along and it began to take on a somewhat mountainous, woodland quality.

Construction

My brother and I constructed the case ourselves: the sides, back wall and bottom are made from reinforced concrete, waterproofed with bondex. The front of the structure is thermopane, one inch thick. Toward the back in the middle of the terrarium is a drain, tapered from the concrete that leads to copper tubing going out to the side of the house.

Because of the differing microclimates, I need more air circulation than one might normally need for a terrarium. I solved the problem by using a three-track storm door window to cover the top of the terrarium, two panes of glass and one screen. When I

need air, I just open the glass and push the screen over. The screen is necessary because of the insects that hatch in the summer and to keep newts, frogs, salamanders and snails that live in the glass house.

Soil

Getting the appropriate soil mixture has been largely a matter of trial and error, particularly because the needs of the plants in the swampy area and dry area differ.

Before putting in the soil, I placed about two inches of crushed stone on the bottom. Size is not important; you just want to insure good drainage. I wanted better drainage on the ends, as well as a somewhat elevated terrain so I piled the stones a little higher there. I then put straw on top of the stones to keep the sand from slipping through. For the plants that require a swampy environment I use a sandy loam soil mixed with leaf mold. On top of that more leaf mold. On the swampy side, where I have approximately an extra inch of stone, I put muck soil from the bogs; I mix the black muck with leaf mold and some peat moss. This combination keeps the area moist all of the time and I usually have plants blooming all winter long.

The soil is only about 7 in. high at the highest point. I usually mix by instinct but it usually comes out to one part each of sandy loam, leaf mold and sand. I use a coarse sand (agricultural bar sand, usually available from masonry or concrete dealers).

On the drier side I used soils collect-

ed with the plants. A lot of old sphagnum moss that I collected is mixed in with the muck soils. Under the pixie moss, bearberry and arbutus, I usually put a little white sand. You have to be careful to control the humidity in this area; otherwise, I've had fungus form. When condensation begins to appear on the glass, I move the glass aside and pull the screen over.

Lights

Just about the time I was toying with the idea of turning the terrarium into a fish tank, I discovered Vita-lux bulbs. I was using Gro-lux up until I ran into George Milstein. He had the exhibit in the aisle across from me at the Flower & Garden Show. He was enthusiastic about the Vita-lux and really sold me on it. They were hard to find, but I finally located a wholesaler in New Jersey who had a supply. I'll admit my observations are purely subjective; I haven't scientifically tested the results of both kinds of lights, but I do think the Vita-lux is superior. For example, when I put the lights in the terrarium, my white violets, which had been in the terrarium several years and had never bloomed, started blooming two weeks later and went right on blooming until they went to seed. My *Woodsia obtusa* tripled in size.

With the new lights I'm also growing things I never grew before: succulents, ground nuts and ferns, for example. It's the first year I've had a green terrarium all summer.

Right now I'm using three 20 watt bulbs. I believe the Vita-lux cuts down

continued



The terrarium seldom sees the light of day. The drapes behind it are always drawn. In any case, the large Norway maple in front of the window would screen out the sun. Three 20 watt Vita-lux bulbs provide the necessary light for the plants.

on the heat (about half) and doubles the intensity.

I think heat in this terrarium is a big problem. The swampy area is on the left-hand side and the dry plants are on the right-hand side. I have to keep the screen open on the right-hand side most of the time. Actually, I've been wanting to put a small fan in there, and maybe one of these days I will. In any case a terrarium of this size must get air circulation; it's not like normal terrariums. Stagnant air makes some of the plants susceptible to fungus.

Watering and Fertilizing

I don't feed the plants at all, and perhaps I should experiment. I water them every couple of weeks and in between squirt them with a syringe. When I built the terrarium, I put a faucet right in it. I use a small neoprene hose with a sprinkler head on it. The little pond (see photo) seems to go dry every week, even though I put two or three gallons of water in it. The pool is made of urethane and I gave it two or three coats of paint. It's hard to figure out why the water evaporates as quickly as it does, unless the pool is more porous than I realize.

I saw a terrific rock up in northern Pennsylvania and I think I'll go back and get it. It's dished and the size of the present pool. I feel it might hold the water longer because it's cooler for

one thing.

I've enjoyed the terrarium enormously. I'd like to keep working at it; for example, I'd like to add a waterfall. Maybe someday I'll get around to that.

the plants in the terrarium

Over a period of time, I've grown hundreds of different kinds of plants in the terrarium. All of the plants are native, although not necessarily native to the Pine Barrens. I bring some back from Maine when I visit up there. I rotate the plants often and thin them out about every six weeks. You have to take care that some plants don't overpower others in the confined area of the terrarium. Some plants seem to require a cold, dormant period. When the time comes, I dig them up and plant them outside.

Listed below are the plants that were in the terrarium when the photograph was taken.


Dry

White violet (*Viola blanda*)
Royal fern (*Osmundia regalis*)
Sensitive fern (*Onoclea sensibilis*)
Poison ivy (*Rhus radicans*)
Pipsissewa (*Chimaphila maculata*)
Partridge berry (*Mitchella repens*)
Ebony spleenwort (*Asplenium platyneuron*)
Woodsia obtusa

Swampy

Swamp saxifrage (*Saxifrage pensylvanica*)
Venus fly trap (*Dionaea sp.*)
Sphagnum moss (*Sphagnum*)
Club moss (*Lycopodium sp.*)
Teaberry (*Gaultheria procumbens*)
Liverwort (*Marchantia sp.*)
Common polypody (*Polypodium vulgare*)
Pitcher plant (*Sarracenia sp.*)

ESPALIERS: for ornamentation and fruit

 by L. Wilbur Zimmerman



A dogwood tree is secured to a wooden wall with metal eye hooks.

L. Wilbur Zimmerman insists that he and his wife Mary are just "average gardeners" who experiment. At present they tend a 175 ft. border that includes 20 varieties of shrubs. The border also includes clumps of tulips and daffodils, varying in depth from 5 to 17 ft., as well as 24 varieties of perennials and 175 lilies (15 varieties). Their espaliers include one *Poncirus trifoliata*, six apricot trees (fan shape), two *Cedrus atlantica glauca* and eight *Magnolia grandiflora*. The magnolias are in the process of being trained.

Man has long had a propensity for gilding the lily. In this connection, one of his more popular pastimes has been the addiction to training plants. One such technique is that of the espalier.

According to Liberty Hyde Bailey, an espalier is a trellis or open support on which a woody plant is trained to formal shape, usually on a vertical plane. The term also applies to the plant so trained. The word itself comes either from the old French term *epaulier*, a piece of armor to protect the shoulder, and hence a forced meaning of the right angle appearance of the shoulder, or the shoulder, or the word *pau*, or *espau*, meaning stake. The stakes are used for training or supporting the plant.

People seem to believe that the art of espalier is an esoteric skill, but those who have tried it have decided that it is not too difficult. Philosophically, it is satisfying to experiment with ways of reordering the vigor and force of natural growth. Aesthetically, espaliers offer great potential for introducing variety to almost any garden plan, as well as a kind of sophistication in the garden that can rarely be supplied in other ways.

Choosing the plant material to be
continued

This *Cedrus atlanticus glauca pendula* was originally almost 9 ft. tall, and is one of a pair. It was topped at 5½ ft. All unwanted laterals were trimmed. The laterals are about 3 ft. from the trunk to the end, or 6 ft. across.



This apple tree, which was espaliered in 1940, was my first try at the art. The Rube Goldberg contraption was strictly improvised, but I'm proud to say that the tree still flourishes.

trained, selecting the site where it will be displayed to best advantage, and the actual manipulation involves judgment and an eye for the balance of line and mass, as well as skill in pruning.

While the earliest examples of this method of culture were practiced by the Romans, we know it best from the 16th century on, as the Central Europeans, particularly the French, pursued the system. The British used espaliers to raise fruit trees in areas where space was limited.

We should consider several factors before starting an espalier: How will the espaliered plant contribute to the overall plan of the garden? What will the mature size of the trained specimen be? Can it be restrained to the area desired? Will it be used as a screening device, or will it be a pattern on a wall surface? Should the plant be an edible fruit or purely ornamental?

You can achieve great variety in the textures, colors and forms used. Books devoted to the subject list different kinds of material that lend themselves to various treatments. The books suggest the limitations of the plants' own structure and habit of growth related to the space and design being considered. For example, yews, crabapples, apricots or pyracantha respond best to a fan shape. *Cydonia japonica*, and apples or pears are most suitable for cordons. For a U shaped gridiron, six armed palmette, or similar formalized patterns, the *Cedrus atlanticus glauca* or apple lend themselves well. For spray shapes, such things as forsythia, philadelphus or cotoneaster give quick and pleasing results.

Supporting the Frame

One very practical problem is how to attach the plant to the wall surface or trellis. If you are using a wall, the method used to attach the framework to the wall requires considerable care to provide durability and sufficient strength. Usually, a fence trellis is easier to provide than is a wall.

For vines and certain shrubs on wooden surfaces, a cord material or wire, attached to a wall or frame with simple lead nails or rustproof nails, with metal loops (french garden wall nails), will do. Be careful, however, not to attach the tying material tightly enough around the plant to cut off circulation.

continued



This flowering crab is a free form espalier, which is fairly commonplace. It's fastened to the wall with masonry nails. This kind of espalier should be on an east or west wall because a southern exposure gets too hot.



The fan shape frame is almost the only way to train an apricot tree since it is not amenable to the more formal palmette verier style. To allow air to circulate between wall and plant, bring the frame 6 - 8 in. away from the wall.





Viburnum is suitable for semi-shaded wall. This espalier has been placed with french nails and flexible lead hooks.

Heat is absorbed and reflected on masonry walls; hence you should devise some way to hold the plant material, if it is fruit, far enough from the wall to permit air to circulate between the two. One of the best systems for fastening a framework to a wall to meet this need is to drill holes $\frac{1}{2}$ in. in diameter, 1 - $1\frac{1}{2}$ in. deep with a star bit or an electric powered masonry drill. These holes are drilled in a position on either side of the space to be used so that a vertical piece of wood 1 in. x 2 in. of sufficient length can be supported 4 - 8 in. from the wall. This can be done by placing expandable lead collars in the holes and inserting threaded $\frac{1}{4}$ in. bar material into the threaded interior of the lead collars. Threading the bar into the inside of the lead collar causes the soft lead to expand and make a tight fit into the prepared hole in the masonry. The wood, drilled with a $\frac{5}{16}$ in. hole is attached to the ferrule protruding from the collar. (See photo and Figure 1.) After each vertical is mounted, it can be strung with cross cables at suitable intervals. The plant can be attached with twine; synthetic fibers are more durable. This method is only one way to supply trellis support for your design. Other arrangements will suggest themselves; I recommend visits to gardens

where espaliers exist, for example, Ladew Topiary Gardens, outside of Baltimore.

The Plants

Because possible designs are so variable, you might want to experiment with sketches until you decide on a line and form that interests you. You can even take the sketch to a nursery; a plant frequently can be found that has a framework with some laterals already in the position to achieve the planned design.

Almost always, branches must be bent to conform to the projected pattern. Depending upon the age of the wood and its character, greater or lesser resistance to flexing will limit the degree to which a branch can be bent at a given time. The bending will be accomplished in stages, and restraining binding must be used to hold the branch in its new position for a few weeks at least before increasing the angle of deflection from the original direction. (See Figure 2.)

It is well to keep in mind that sap flow in any plant material is strongest in the vertical boughs, so that growth is more rapid in that direction; therefore, the plant should be pruned more frequently to restrict growth.

Many people suggest that the tyro

not begin espaliers by using fruit trees; however, they really are attractive as well as utilitarian. Fruit trees grafted to a dwarfing stock are more easily managed and controlled than standard size trees; they fruit at an earlier age and do not produce such an excess of woody growth. For the beginner who would attempt this form of cultivation much can be learned by the purchase of an already trained tree on a trellis to study how an expert does it. At that stage it will be necessary to learn the difference between a fruiting spur and a non-fruiting one when pruning and thinning.*

Branches, leaves, blossoms and the subsequent fruit are developed from eyes or buds formed the previous year. Most fruiting buds form at the base of leaves or in the midst of a rosette of leaves at a branch terminal. The buds at the tips receive the greatest surge of nutrient, the next below the next greatest amount and thence in decreasing strengths on down the stem. The fact that much of the sap passes by the lower buds makes them develop less rapidly, and to a lesser extent.

*See "Pruning Fruit Trees and Grapes," *The Green Scene*, July, 1973.

That is important to know when cutting; no stubs above a bud should remain. A cut just above the bud will divert the sap to the bud and a branch will develop in the direction in which the bud is pointed. It's usually desirable to divert a sprout that faces outward laterally. Of course, all cuts should be made as flush with the trunk or branch as possible. Summer shoots that are young unripe growth produce only leaves. It takes ripe wood usually of the previous year to produce fruit. A short branch that ends in a fruit bud will not grow any longer. If you want more growth at this point, the bud should be pinched off, and usually a so-called sleeping bud below will be stimulated to break forth as another branch.

Judicious pruning in late spring or

early summer, when the sap flow is strongest, will promote fruit production. It is better to have a few robust branches than numerous weak ones. Such pruning can never be carried to its ultimate efficiency in a standard orchard tree, but can be done more effectively on dwarfed plants.

To induce a branch to bear fruit rather than so many leaves, it is necessary to create a strong growth and then check it by cutting the distal portion in some degree. I use a method that I believe augments fruiting or flowering instead of so much vegetative growth. I use a fertilizer mixture of 5-20-20 formulation to minimize the stimulation of vegetative growth by nitrogen; the phosphorous and potash provides stem and fruit development.

Knowing that dwarf fruit trees have

a shorter life than standards, the amateur gardener can save a lot of time by buying trees budded and trained and grafted on dwarfing understock.

The whole process of training and maintaining such shrubs and trees presents the kind of challenge that will open up vistas of new ideas for the gardener and give the satisfaction of accomplishing what comes with acquiring another skill.

reading about espaliers:

Espaliers and Vines for the Home Gardener, Harold O. Perkins (Van Nostrand 1964)

Ornamental Dwarf Fruit Trees: How to Grow and Train Them in the Home Garden, Eberhard Abjornson (A. T. De La Mare 1929)

Trees for American Gardens, Donald Wyman (Macmillan Co. 1965)



Here is a system that I developed for setting the frame at a sufficient distance from the wall. The lead collar is placed in wall, expanded by threaded steel rod twisted into position. The wood is fit over the ferrule and made tight with wood putty.

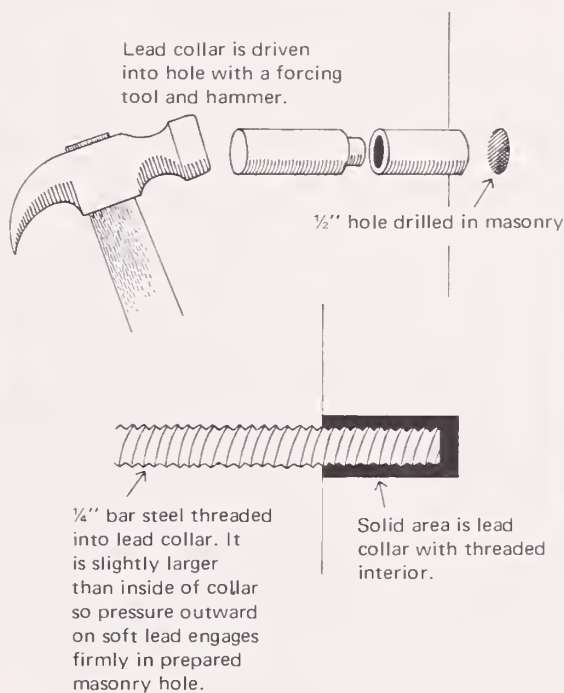
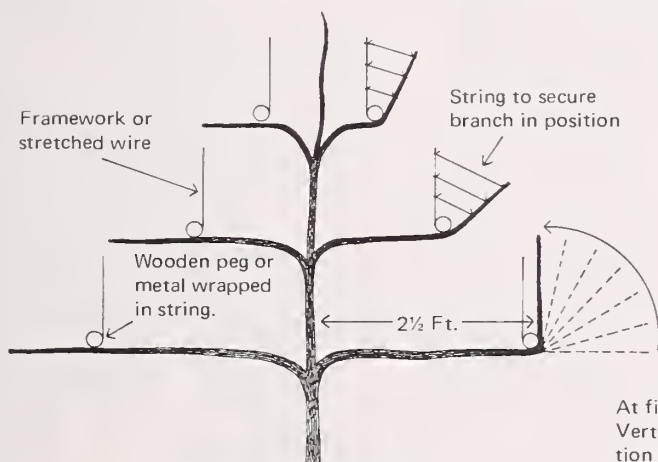


Figure 1



Training frame to achieve espalier

Figure 2

At first branches are secured to frame horizontally. Vertical effect is created in stages. Angle of deflection is achieved by moving branch upward 10° or 15° and allowing a rest period before putting more flexion on it.

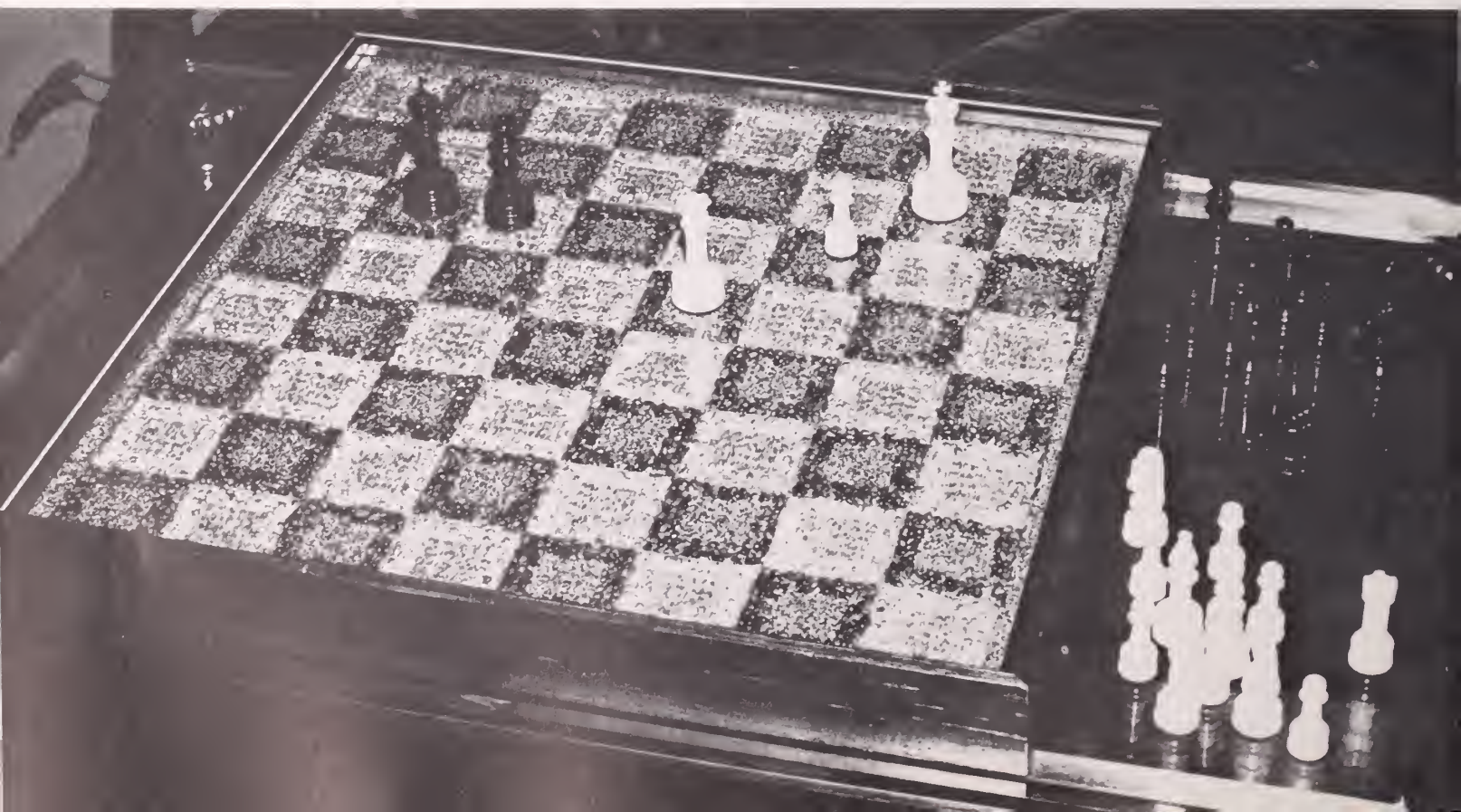
FOUR UNUSUAL SEED MOSAICS



by Priscilla-Gene W. Shaffer

The happy convergence of many small elements in our everyday life pushes creativity to the fore. The author combines rice, seeds and spices with jazz to get blue ribbon results.

Chessboard



Have you held dried tomato seeds in your hands and noticed their soft texture? Have you been intrigued by the smooth surface of sesame seeds, the bold character of the dried sugar pea or the lovely rose color of radish seeds? I have. These little gems of the plant world can be combined to do amazing things. I have enjoyed creating mosaics for a number of years and find it challenging, rewarding and fun.

Walkways of faraway cities may come to mind when thoughts turn to mosaics of long ago, or perhaps the interior walls of ancient cathedrals. Instead of marble tiles, seeds are the building blocks of the designs you can create at home. The techniques used are suitable for making any type design, primitive as well as more advanced designs, with depth, subtle shading and fine detail work.

The mosaic is an ancient art form and artists did not achieve perspective in their designs. I have read that the most effective pictures are those in which all lines are simplified and without perspective. It has been suggested that one should use bold seeds and keep the designs primitive in feeling as seeds do not lend themselves to designs with third dimension and intricate detail.

depth

You can, however, capture an illusion of depth. Sketch leaves in front of and behind stems as they appear in nature. Draw flowers at various angles. Use color and textural contrast or overlap materials within the design.

These concepts have been applied when creating the mosaic of the "Flower Arrangement." The tulip on the left appears to be nodding toward you, almost showing the center of the flower, while the tulip on the right is in a more upright position. The curved stem of the tulip in the center suggests it is leaning in still another direction. If you follow the stem of the iris (top right) it disappears behind the tulip and leaves. This overlapping of elements causes the iris to appear farther in the background, achieving an illusion of depth.

Another method for creating perspective is through the use of color. Light colors advance, seeming to move toward you; dark colors recede, tending to move away from you. The painter, creating designs on a two-dimensional canvas, can create a feeling of third

dimension—leading the eye into the distance—using these facts about color.

We are aware that an object viewed at close range will appear larger than if it were viewed from farther away. Combining this knowledge with that of color, I selected large golden wax beans, which are also light in color, to suggest anemones in the lower part of the "Flower Arrangement" mosaic. They cannot help but leap into the foreground when compared to the iris made of small eggplant seeds of a darker color.

Fine detail work as seen in the vase

is a real challenge, but can be accomplished with care and patience. The source of inspiration for this vase was from a photograph of the early 17th century painting, "Flowers In A Delft Vase," by Jan Breughel, the most prolific painter of the Flemish School. Very small seeds such as dill, carrot, eggplant, endive, kohlrabi, lettuce and even grass seed are but a few that can be used for this exacting art.

I cannot stress forcefully enough the importance of using the proper mechanics in making mosaics. Just as the proper utensils in the kitchen can-

continued



Flower Arrangement

not insure a tasty meal, they will, however, help the preparation go smoothly. When making a mosaic, the proper backboard and cement can make all the difference. If the backboard is flexible, or the glue you use grows tired, the seeds simply fall off as time passes. This happened to my first picture, before I knew about Elmer's Glue.

A backboard can be made rigid by gluing several thicknesses of posterboard, cut to size, on top of one another with contact cement. Cementing one piece of posterboard to sheet copper has also worked satisfactorily. A sheet of glass purchased at the hardware store may also be used. The drawback to using glass as a backboard is that you cannot lightly draw your design on it in pencil; you must use a pen with washable ink. Should you make an error, you cannot simply erase as you would using pencil on posterboard. The error must be removed by carefully wiping with a damp paper towel.

Elmer's Glue always has a way of coming to the rescue. It holds the seeds securely to the backboard, dries quickly, becomes transparent when dry, and does not distort the color of the seeds.

chess, anyone?

A chessboard made of seeds is a guaranteed conversation piece. Construct eight rows, each containing eight squares equal in size on the backboard, allowing at least one-half inch for a border around the board. Edge each square with small seeds, contrasting in shape and color to aid the players in seeing the definite outline of the squares. Light and dark squares must alternate in both directions across the board. These squares may be filled in with solid colors, or you may prefer a design within each. The designs should be of the same type throughout, since many different designs would confuse the players.

To outline the squares, first squeeze a thin line of Elmer's Glue on the backboard and then apply each seed with tweezers. I chose salsify seeds for this job because their long, cylindrical shape is good for making straight rows. Fill in the center of a square with glue and apply each seed individually before going on to the next square. Spread glue over an area no more than one



Mother and Child

inch square at one time. It has been my experience that if glue is spread over a larger area, it dries before the last seeds can be placed. Very fine seed, such as rye grass, is almost like powder. These seeds should be sprinkled on the glue instead of placed individually with tweezers. The excess seeds are removed by tapping the board when held in an upright position. Work with the backboard flat on a table when applying the seeds.

Spray the completed design with a clear plastic spray. It acts as a protective shield preventing moisture from attacking the glue and enriches the color of the seeds.

To insure a smooth playing surface and to keep the board flat, sandwich the design between two pieces of glass. Secure the glass with decorative plastic tape that is wide enough to wrap around the edges and onto the flat surface of both panes of glass. You may choose to "frame" your chessboard in this fashion, using tape color coordinated to your design. Or you might have it framed to hang on the wall as an interesting design of shapes and textures when not used for playing chess or checkers.

Seed mosaics take weeks, sometimes months, to complete. So be especially critical to select a frame that will properly compliment your design. Don't quickly pick one at the five and dime. Have the frame custom-made after the design is finished, so that it will be in keeping with the mood of your design. Glass should be installed over your

design, when having it framed, to protect the seeds from the accumulation of dust.

I look forward to the weeks that follow the hectic pace of the Christmas Season. This is a time of reflection and a period that can be very productive when it comes to projects of the indoor variety. The design of the "Mother and Child" reflects the meaning for our celebration: the three triangles represent the Holy Trinity, with emphasis on the center section, the Christ Child.

The mosaic was made on three sections of posterboard before being mounted on a backboard covered with satin. The background of the triangles are made of pepper seeds and then edged with lentils and carrot seeds. The lentils are repeated in the halo. Eggplant seeds were used to make the woman's headpiece and kohlrabi seeds for the border with the backboard of white posterboard showing through. Parsnip seeds were used for the hair, lettuce seeds for the faces, and tomato seeds outlined with carrot seeds for the star.

and all that jazz

One of life's pleasures is exhibiting in the niche classes at the Philadelphia Flower and Garden Show. "Rough and Smooth" was one class I chose to interpret in the 1973 Show. Competition is intense at the Show and one must stretch the mind, reaching out beyond one's known limitations. We should have the daring to try something new, perhaps controversial when compared to previous concepts in the art of design. Therefore, I chose to create a mosaic background for the niche using twigs, rice, seeds and spices to introduce a rough element in this study of texture. White phalanopsis orchids and black glass were used for smoothness. The centers of the orchids repeated some of the colors of the mosaic background.

How does one work at creating something of this nature? In this case, I played a recording of cool jazz over and over. Sometimes I played it softly, other times as loud as I could possibly stand it until every nerve in my body and every cell in my brain became saturated with the music. Then, I began placing the seeds as though directed by the music. Perhaps the twigs reflect

the staccato notes of the trumpet, the fluid form made of tomato, mustard and sesame seeds the mellow saxophone. That particular day in '73, the judges spent three hours making their decisions. You can imagine what was going through my mind as I waited on the "public side" of the barricade. And then it happened, the blue ribbon.

I have discussed only a few of the many seeds that can be used in mosaics. The list from which to choose is long, from asparagus to marigold to onion, watermelon and zucchini. Each contributes something unique in character. Don't overlook what is to be found at your grocer's spice department, caraway seeds, rosemary leaves and dried mustard seeds, to name a few. Your seeds can be stored safely in pill bottles and baby food jars to protect them from dust and moisture and from being scattered. Label the containers for your convenience.

Working with these small forms that nature has provided has given me hours of pleasure and satisfaction. Creating something unusual is within reach of all of us, be it creating special effects with plants indoors or expressing ourselves with a paint brush. It takes some daring to try. It takes the willingness to reveal our emotions. It takes the courage to begin anew if the end results do not compare with the promise of vision. During these winter months, when our gardens are not demanding daily attention, experiment and let the "creative you" come forward. These precious seeds, which hold one of the keys to our survival, also provide building blocks for personal expression.

Priscilla-Gene W. Shaffer is a horticultural graduate of Temple University/Ambler Campus. She was chairwoman of the 1967 and 1968 Harvest Shows staged by the Pennsylvania Horticultural Society, and Old York Road Garden Club's 1972 Standard Flower Show. Mrs. Shaffer has received national awards for her flower arrangements and the Jackson and Perkins Trophy at the 1973 and 1974 Philadelphia Flower & Garden Shows. Her designs have been published in the 1970 Vision of Beauty Calendar of the National Council of State Garden Clubs and will appear in the 1975 edition. Her designs also appeared in the 1974 Burpee Seed Catalog and vegetable seed packets, and in the 1974 April issue of *Family Circle Magazine* for the National Garden Bureau. At present she is a member of the faculty at the Ambler Campus of Temple University as a flower arrangement instructor.



Rough and Smooth won a blue ribbon at the '73 Flower & Garden Show in the niche section.

The botany of this isn't quite right but the logic is!

Washing

This must be done frequently. A plant breathes like an animal, and not through one mouth, but thousands. As is well known, the plant draws up its food from the soil through the roots, in a liquid form. This food, very much diluted, must be concentrated, and thus assimilated to the plant. We have in the leaves of the plant, a most beautiful arrangement to answer this need. They are filled with "stomata," or breathing pores, which allow exhalation when moisture is freely supplied, and check it when the supply falls off. These little mouths are found on both sides of the leaf in most plants, but usually on the lower side in by far the greater number.

Window Gardener, E. S. Rand, 1882

Temperature

The greatest success will be found to come from a uniform temperature of 45 or 50° at night, and 60 to 75° in the day time; 80° is too hot except for only some plants of semi-tropical character. Under no circumstances should the temperature go below 35°. If your living rooms, where your plants are placed must be considerably warmer than this in the former part of the night, then set the plants on the floor, shade from the light until the time of retiring, and then return them to the window sill or flower stand. Perhaps from no other cause than this, too great heat, during the day and long continued at night, our city grown plants grow so sickly and lanky in appearance.

Window Gardening, Henry T. Williams 1872

Landscape Gardening

If a dead level were the thing needful to constitute beauty of surface—then all Holland would be the Arcadia of Landscape Painters It is not the less fearful to see, as we have often seen in this country where new places are continually made, a finely varied outline of ground utterly spoiled by being graded for the mansion and its surrounding lawn, at an expense which would have curved all the walks and filled the grounds with the finest trees and shrubs, if their surface had been left nearly or quite as nature formed it.

Rural Essays, A. J. Downing, 1853

The Ivy

Those uses of the plant, however, which come within the range of the romantic are not to be slighted. To the Ivy we are without doubt indebted for the preservation of many a stately pile that would erst have become dust without it. Thus it may be regarded as the vegetable keeper of historical records, for although it may thrust rude hands amongst them, as when it sends its roots deep into the wall of a tower or keep, it affords a protecting shield against wind, and rain, and snow.

The Ivy, Shirley Hibberd, 1872

A Very Special Collection



by Julie Morris

A book that I often use as a reference for growing plants indoors is a tiny volume titled *Parlor Gardening*. It contains sound and useful information. What's unusual about this particular book is that it was published in 1861.

I first saw a copy of *Parlor Gardening* after it had been rescued from a trip to the town dump ordained by a harassed librarian in an overcrowded New England village library. The discerning savior gave me much more than a little book on gardening indoors when she brought me her find.

First, I couldn't wait to see if we had the book in the PHS collection; we did. Then, my curiosity was piqued, and I was anxious to investigate other gardening books of the same period. Most of the books I found are now in the PHS Special Collection located in the library's gallery. The Special Collection is made up of books published before 1890, books written or published in Pennsylvania and books deemed too valuable or fragile for circulation, yet not quite important enough for the Rare Book Collection.

Every kind of gardening is covered in the collection. Admittedly, those I selected to discuss are among my favorites. Special Collection books don't circulate but are available for use in the library at any time.

The title page of M'Mahon's *The*

American Gardener's Calendar is so full of information that it alone almost makes the book worth perusing. M'Mahon's eleven editions attest to its popularity and longevity. It was first published in 1806. M'Mahon settled in Philadelphia where in 1804 he published a seed catalog listing 1000 species. He was instrumental in sending seeds to Europe, was a friend of Thomas Jefferson, and it is believed

Robinson advises against the "lumpish monotony" found in most designs of the time and begs that the "troops of cannas" be disbanded in favor of graceful lines that will emphasize plants the author considers subtropical.

that the Lewis and Clark expedition was planned at his house. PHS researchers used M'Mahon to determine what plant material should be used in the PHS 18th Century Garden.

Many of the Special Collection books have been part of the library's inventory since their publication. Some of the books, however, came as gifts or bequests. Of interest are the thoughtful remarks penciled in many of the margins as the gardener using the book compared notes or obser-

vations with the author. It is obvious by their condition that many of the books were carried out to the garden, not just read by the fireside. Books were prized possessions, costly to print and highly valued. Most of the gardening guides of the mid-nineteenth century were small in size and were easily carried about.

Many gardeners lament the disappearance of wide selections of plant species and varieties. Looking through a recent seed catalog might seemingly quell such anxiety, yet we have lost many plants no longer available commercially. *Subtropical Gardening* by Robinson (1871) lists 13 species and 98 varieties of cannas, 70 species of ornamental grasses and hundreds of plants unavailable today. Robinson advises against the "lumpish monotony" found in most designs of the time and begs that the "troops of cannas" be disbanded in favor of graceful lines that will emphasize plants the author considers subtropical; plants having large or handsome leaves such as araucarias, cycads or acanthus, for example.

Most of us will never be concerned about the treatment of plants placed in a London sitting room, but the florist who wrote *Bouquet* does remind us that mignonette is one of the most fragrant of plants suitable for a sunny, cool window.

continued

Winter Greeneries by Edwin Johnson, stresses the importance of low temperature when growing plants indoors. In light of the energy crisis his admonitions should be helpful. Besides noting that plants need a 10° drop in temperature at night, Johnson assures us that if we can keep the house temperature up to 45° or 50° at night we won't have to worry about the plants' safety. The author warns that such tropical plants as crotons, caladiums and marantas are best grown in closed cases where 60° can more easily be maintained.

Delightful drawings promising a "new Eden" in the 19th century house accompany the author's advice in *Winter Greeneries*. Johnson's cultural information on soils, potting and general plant care is as sound as any offered today.

Two early greenhouse books caught my attention and have provided delightful snatches of reading. The catalog of books offered in the back of *Hot-Houses* and the careful construction advice offered to professional gardeners of the period in *The Greenhouse* testify to the tremendous popularity of gardening with tropical and subtropical plants not only in the 19th century but earlier. M'Intosh, in *The Greenhouse*, writes of the history of tropical gardening dating its origins to the middle of the 16th century. By the early 18th century 5,000 species of exotic plants had been introduced to England. The author lists 350 kinds of heather alone. This little book is illustrated with some fine color plates.

Books by Hibberd and Lowe about beautiful leaved plants offer fine color plates of tropical foliage plants with accompanying cultural requirements. Again we note that some of the plants prized less than 100 years ago have disappeared from cultivation.

Domestic Floriculture written in 1874 by F. Burbidge has ideas for many types of window gardens that could be adapted for today's gardeners. Charming detailed drawings illustrate the author's designs. Some of his ideas should inspire designs for flower show

entries.

Plant lists, new introductions, gardening history and the men and women who made that history are some of the reasons for the importance of the books in our Special Collection. There are many books on my list that I've not discussed but that doesn't lessen their importance or interest. Cole's book on fruit growing documents the quantity of fruit varieties available in 1849; 68 plum varieties were once offered on the market. Thomas Meehan, a well known Philadelphia horticulturist who contributed much to PHS's own history, chronicled the trees in John Bartram's garden in the *American Handbook of Ornamental Trees* making it a valuable research tool. Meehan's own copy of this book will be part of the Society's headquarter's exhibit in 1976.

Our horticultural heritage takes



many forms. Books are part of the heritage whether they be 15th century herbals valued at thousands of dollars or simple 19th century handbooks. Our Special Collection is a stepping stone that guides us back to our immediate past that gave us the plants we grow and enjoy today both indoors and out.

book list

- Alpine Plants*, David Wooster, George Bell & Sons, London, 1874
- The American Fruit Book*, S. W. Cole, John P. Jewett and Co., Boston, 1850
- The American Gardener's Calendar*, Bernard M'Mahon, Lippincott, Grambo and Co., Philadelphia, 1851
- The American Handbook of Ornamental Trees*, Thomas Meehan, Lippincott, Grambo and Co., Philadelphia, 1853
- The Bouquet*, by a florist, Simpkin, Marshall and Co., London, 1839
- Floriculture*, F. W. Burbidge, William Blackwood and Sons, London, 1874
- Flower Gardener*, Louisa Johnson, S. Babcock and Co., Charleston, 1842
- The Greenhouse*, Charles M'Intosh, Wm. S. Orr Co., London, 1840
- Hot-Houses*, Robert Leuchars, C. M. Saxton, Barker and Co., 1860
- House Plants*, Lizzie Page Hillhouse, A. T. DeLaMare, New York, n.d.
- In-door Gardening*, William Keane, Journal of Horticulture and Cottage Gardener, London, 1863
- The Ivy*, Shirley Hibberd, Groombridge and Sons, London, 1872
- Parlor Gardening*, C. J. Randolph, J. E. Tilton & Co., Boston, 1861
- The Rhododendron and "American Plants,"* Edward Sprague Rand, Hurd & Houghton, New York, 1876
- The Rose Manual*, Robert Buist, Caney and Hart, Philadelphia, 1847
- Rural Essays*, A. J. Downing, George P. Putnam & Co., New York, 1853
- The Subtropical Garden*, W. Robinson, John Murray, London, 1871
- The Window Flower Garden*, Julius J. Heinrich, O. Judd Co., New York, 1887
- The Window Gardener*, Edward S. Rand, Houghton Mifflin & Co., Boston, 1882.
- Window Gardening*, Henry T. Williams, Henry T. Williams, Publisher, New York, 1872
- Winter Greeneries*, Edwin A. Johnson, O. Judd Co., New York, 1878



SOME GRAND CONIFERS

The main entrance to the Morris Arboretum is graced by four magnificent conifers. They are four of the largest trees on the grounds and some of the largest of their species in the Philadelphia area. Three of these evergreens, the eastern white pine, the Cilician fir and the Himalayan pine, are especially suited to winter viewing. The hybrid larch, center of the group, is now bare, but its tall silhouette will be among the earliest trees hazed with green as spring approaches.

As rapidly growing trees, all have nearly reached their full growth potential; they are between 80 and 100 ft. tall. None are rare in this area; all are found in the Philadelphia environs, often as mature trees. Yet, on a listing of the largest trees in southeastern Pennsylvania compiled by nurseryman-educator, Dr. John C. Swartley, three of the Arboretum trees carry away honors.

The four conifers were surely among the earliest plantings made by founders John and Lydia Morris. Because record-keeping in early years was sporadic, we can only, like a town gossip, take our growth rates and count backwards. The planting dates for the four trees discussed figure in the time period 1890 to 1905.

To the right of the path from the Hillcrest Pavilion, and central to the

continued



Pinus strobus (center). The feathery branches in foreground are *Larix x eurolepis*.



Can you identify the foliage of the four trees? (See answer on page 27.)



Himalayan pine (*Pinus wallichiana*)

photos by Gary Koller

grouping of four, is the *Larix x eurolepis*. As the "x" indicates, this is a hybrid larch, in fact a cross between the European and the Japanese larch. It is nearly 100 ft. tall, its broad branches sweeping the ground in a 50 ft. diameter. The top branches have a definite upward reach; lower ones are horizontal. Branchlets hang from limbs in what seem garlands of soft-needled foliage. The delicate short needles are borne in flower-like whorls on older growth; branch tips bear needles singly. In keeping with the small scale of the foliage, the profuse golden brown cones are a tiny inch long by three-quarters of an inch wide.

An unusual feature of this tree is that on its western exposure there has developed a distinct dense growth of small branches. This bundle is known as a "witches broom," and from such a formation dwarf conifers are developed. Removed from the parent, and grafted onto root stock, it will maintain its miniature status.

Unlike most cone-bearing trees, the larch is deciduous. Its leaves turn a yellow to golden-brown in the autumn and fall by late October. As a faithful harbinger of spring, the larch produces

tender green needles when most other trees seem still asleep.

Larix x eurolepis is a cross between *Larix decidua*, formerly *Larix europaea*, thus the "euro"; and *Larix kaempferi*, formerly *Larix leptolepis*, thus the "lepis." The *Larix decidua* parent is native to the mountains of Europe from the western Alps to the Carpathians and western Russia. It is a common tree in Europe, valued as an ornamental and for its strong, lightweight, and easily worked wood. And on another scale of utility, ancient folk prized it as a protection against enchantment and evil spirits.

The European larch prefers high mountain elevations in high rainfall districts. Where these conditions exist in Europe, larches grow profusely right up to the tree line. Its dense forests are never somber, however, for its open crown and airy foliage allow much light to penetrate and encourage the growth of mosses and similar hardy plants beneath. Low mountain strains of the European larch do quite well in the Philadelphia area.

The other parent of our *Larix x*

eurolepis is the Japanese larch (*Larix kaempferi*). Its home is Japan around the holy mountain, Fujiyama, and the neighboring volcanic area. It is a tree for large scale plantings, with a light, airy, deciduous foliage. Only in its native range, at elevations above 7,000 ft. does it take on a bushy form and grow beneath the companion birches.

Though the Japanese and European larch appear quite similar in general character, several distinctions exist. The Japanese is somewhat smaller and slower growing, has a slightly longer leaf, and seems better adapted to low altitude growing conditions than its western counterpart. Confirmed identification between the two species can be made by cone comparison.

Hybridizing of the two larches usually produces an heir with the qualities of the Japanese larch. The specimen at the Morris has the distinction of being just the reverse: in it the qualities of *Larix decidua* dominate.

To the left of the hybrid larch is a *Pinus strobus*, or eastern white pine. This tree is native to the cooler parts of the eastern United States and one of the most commonly planted pines in our area.

The white pine at the main entrance is one of several towering specimens on the Arboretum grounds. (The white pine to the right of the path paralleling Germantown Avenue, and a second on the slope behind Gates Hall are also handsome specimens.) Its height approaches 100 ft., and its branches tent the ground in a diameter of 40 ft. The main stem seems to be at an angle to the horizon and, like a viewer of

Where a fast-growing windbreak, border, or specimen tree is sought, the white pine will prove more than satisfactory.

that monumental crooked tower in Italy, one automatically cocks one's head. The trunk forks at about 13 ft. from the ground with the double trunks rising thereafter in a twined silhouette.

The 3- to 4-in. needles are colored bright green on the topside, a whiter hue beneath; bark is a scaly dark brown. This tree is a beautiful bold contrast to the grand delicacy of the

neighboring larch.

A mature white pine usually has the distinctly dramatic silhouette evident here. Its random pattern of black-green limbs outlines great patches of blue sky. The foliage feathers out to a grey-green color at branch tips, as if a Zen master had added more water to his color pan.

But the irregularity of the older tree is contrasted by a youth of rigid, mathematical conformity. The five-needled *Pinus strobus* follows what has been called by one author, a semi-decimal growth pattern. Each year the white pine produces a crown of a central bud and five surrounding buds, the potential leader and five branches. The five branches develop to equal lengths and remain at an equal distance from one another. Each horizontal branch layer yearly produces the same number of radiating branches. No odd branches are produced between these whorls, and so stringent is the growth pattern that a tree's age can be estimated by counting their number. The "pagoda" effect of the regularly graduated branch layers can be seen in other tree species, notably the Norfolk Island pine.

The perfect symmetry of a young white pine gives way as, in later years, branches are crowded and die. In deep woods, where trees grow closely, limbs often die so young that the lumber produced bears almost no knots.

And speaking of lumber, the eastern white pine is historically the most important lumber tree in the United States. When the American colonizers arrived they found stands of white pine unlike any timber tree available in England or northern Europe. Vast virgin forests contained trees 200 to 250 years old, with occasional giants up to 350 years of age. Many a pine was marked with a broad arrow and reserved for the king's navy, for the tall straight trunks made incomparable masts for the English men-of-war.

As a strong, light-weight, easily worked wood, least resinous of the pine family, the eastern white pine was king of commercial timber throughout the 1800's. Natural reserves began to be depleted, and though reforestation was taking place, the pine fell into disrepute as a lumber source in the 1900's. The reason was its susceptibility to white pine blister rust and the white pine weevil. The former has proven controllable, the latter has not.

Thus the eastern white pine has surrendered its leadership of the lumber industry to the California sugar pine.

The homeowner, however, should not find this talk of disease discouraging; the eastern white pine remains vigorous in the Philadelphia area. It is not a good inner-city or roadside tree, but where a fast-growing windbreak, border, or specimen tree is sought, the white pine will prove more than satisfactory.

To the right of the hybrid larch, and fully a companion in grandeur, is the Himalayan pine (*Pinus wallichiana* formerly *Pinus griffithii*). Other Himalayan pines dot the Arboretum grounds. Especially notable is an 80 ft. bushy tree flanking the old mansion entrance. But John Tonkin, retired superintendent, remembers the day founder John Morris planted this pine in its present site beside the path. It is the third largest *Pinus wallichiana* in the area (Dr. Swartley's big tree listing).

This great pine has an open, irregular appearance. Its pale grey, scaly-barked trunk is pockmarked from the loss of branches over the years. Its large, irregularly spaced limbs are horizontal on the upper tree, and droop

drooping needle. Leaves are colored green on the top side, silver beneath, and the alternating colors soften the total hue. A few resinous cones are evident; this year they are a tightly packed green form, 5 to 6 in. long, an inch and a half in diameter. In maturity the curving cone will be a golden brown.

As the common name implies, the pine is a native of the Himalaya Mountains. It is found at elevations from 6,000 to 12,500 ft. and in a range from Nepal to Afghanistan. The Himalayan pine is not particularly rare in our area. Philadelphia and its suburbs have numerous trees 65 years old. Older specimens, such as the one at the Morris, were probably raised from seed by either the Andorra or Meehan's Nursery, both of which stocked the tree early in the century.

Today this pine is carried only by rare plant nurseries. As a fast growing, broadly spreading tree, it is suitable for the large garden or park. The light shade it furnishes will allow the growth of semi-shade plants beneath. In a rich, damp loam, and in a protected spot, the Himalayan pine will reward the gardener with a handsome, gentle, giant of a tree.

In contrast to the three aforementioned ground sweepers, the Cilician fir rises tall and columnar. Situated between the hybrid larch and the Himalayan pine, this native of the hills of Turkey and Syria adds a final exclamation point.

Our *Abies cilicica* is a dense, dark green pillar of foliage. Its branches spread an equal 12 ft. almost to its 80 ft. crown. The short, one inch needles are, as is the case with all firs, borne singly. Its cones are hidden in the uppermost reaches of the crown.

In its native range the Cilician fir is often found growing with the cedar of Lebanon. More of the firs and cedars of the Mediterranean basin can be seen in the plantings on the perimeter of the Azalea Meadow. (Here are the Lebanese, Deodar, and Atlas cedar, the Greek and, again, the Cilician fir.)

Abies cilicica is a vigorous, hardy tree, relatively free of insect pests. In the Philadelphia area it reaches almost the growth potential of its natural range, and its dense, dark, evergreen foliage provides an excellent counterpoint to the paler conifer and the winter-bare tree.



Tall tree in the center is *Abies cilicica*; foliage in extreme upper left-hand corner is *Larix x eurolepis*.

slightly at ground level. The foliage has a diffuse and delicate coloring, the general effect of which is a light grey-green.

The leaves of the Himalayan pine are borne in bunches of five. As a member of the five needle pine group, it is sibling to the *Pinus strobus*, and the two have been known to produce a hybrid. Its plummy foliage effect is created by a 6 in., soft-to-the-touch,



by Susan B. Blum

answer (photo, page 25):

Compare the foliage of the four trees:

1. *Abies cilicica*. 2. *Pinus wallichiana*. 3. *Larix x eurolepis*. 4. *Pinus strobus*.

A CEDAR IN LEBANON WITH FAIR BRANCHES,



Cedar of Lebanon at the John J. Tyler Arboretum, Lima, Pa. Planted about 1860. The diameter of the trunk is about 15 ft. in circumference.

The righteous shall flourish like the palm tree: he shall grow like the cedar in Lebanon. Psalms XCII

Many are the poetic references to the cedar of Lebanon in the Bible. More practical are the descriptions in the early chapters of I Kings of the building of Solomon's temple and of his own house. Cedar timber supplied by Hiram, king of Tyre, was first in importance in their construction.

All through ancient times the Mediterranean world called on the forests of Lebanon for cedar wood. It is coarse and brittle, but very durable. It was in demand for great buildings, for ships, for coffins for mummies. The cedar beams of Apollo's temple in

Utica are said to have lasted for over a thousand years.

All through the Lebanese mountains the trees were heavily cut, and the erosion that followed as well as the grazing goats prevented natural regeneration. There remain, therefore, only scattered groves, now protected. In one of the most famous there is a tree (if it survives) about a thousand years old, about 80 ft. high, with a trunk circumference of about 47 ft. However, in the Taurus Mountains of southwestern Turkey there are extensive forests of this beautiful tree, and this

more northern variety is hardier than the Lebanon variety.

But now we must get to the Tyler Arboretum's fine cedar. It is readily seen towering over the left wing of the barn as you walk along the road after leaving the parking lot. It was planted by the Painter brothers between 1849 and 1854, so is a young tree only in the first half of its second century. It has the upward-reaching look of its youth. However, it is now beginning to show a slight flattening of the top, quite different from its appearance in pictures taken only a few years ago. Eventually it will acquire an even flatter top, and it will assume the aspect of mature trees to be seen in European gardens.

As you approach the tree and finally stand under it and look up into its branches, you will see the value it had for ships' knees. The branches develop many angles, and form a fascinating pattern.

The cedar of Lebanon belongs to a small genus of the pine family. Most botanists consider the genus as containing four species: *Cedrus libani*; the very similar *Cedrus atlantica* from the Atlas Mountains of north Africa; *C. brevifolia* of Cyprus, smaller, with shorter needles and less hardy; and the handsome deodar, *C. deodara*, denizen of the Himalayas. Some botanists reduce the number of species to two, lumping those of the Mediterranean area together, and others consider them four geographic variations of just one species. To the gardener, the differences among them are of importance.

The needles of the cedars are arranged in two ways. On the faster-growing leading shoots, they are borne singly. But most of them are in tufted clusters on short spur-like branches. The larches (*Larix*) and the golden-larch (*Pseudolarix*) have the same needle arrangement, but they are deciduous, and their foliage is a lighter green.

Both the pistillate and staminate cones are borne upright on the branches. The finger-sized staminate cones are freely produced, and an attractive



THE
TYLER ARBORETUM
515 Painter Road • Lima • PA 19060
Lo 6-5431

AND WITH A SHADOWING SHROUD

Ezekiel XXXI

bright green before they start to shed their pollen in autumn to fertilize the tiny pistillate cones, which take about two years to mature. Then, the deodar and cedar of Lebanon cones are about 3 to 4 in. long and up to 2 in. thick; those of the Atlas cedar are a little smaller. When they are mature, they do not fall to the ground in one piece, but like fir cones, they disintegrate on the tree, shedding seeds and scales. Whole cones dislodged by storms are immature, and remain as hard and solid as if carved out of wood for many years.

The deodar is the giant of the genus, reaching over 200 ft. in its native mountains. The Atlas and Lebanese cedars reach about 120 ft. A fragrant oil can be distilled from cedar wood, and that of the deodar is used in India for incense. All are still used for their timber.

The deodar is on the borderline of hardiness here. The J. Franklin Styer Nursery in Concordville, however, does have a form that is hardier than the average. Deodars are much grown on the West Coast, and fine specimens can be seen on the Eastern Shore and in the Richmond area. I am told, however, that where ice storms are frequent that they are apt to suffer damage. The needles are longer than those of the other cedars, and its leader and branchlets more pendulous. It is a graceful tree. As it ages, it develops the same characteristic branching of its relatives.

In our area, the blue-foliaged variety of the Atlas cedar is the one that has the greatest appeal for gardeners, and recently the weeping blue variety has become popular. I suspect that many blue Atlas cedars are planted so that their beautiful foliage can be used in flower arrangements. Cutting of a young tree should be restrained. It is reported from London that the Atlas cedar withstands the smoke of London better than the other cedars.

We are accustomed to call many kinds of trees cedar that are not members of the genus *Cedrus*. In our area, there is the red cedar, *Juniperus virginiana*. The tree of New Jersey's cedar

swamps is the swamp white cedar, *Chamaecyparis thyoides*, sometimes also called cypress, just to make it harder. The arborvitae, *Thuja occidentalis*, is also called white cedar, and the incense-cedar of western North America is *Calocedrus decurrens*, long known as *Libocedrus decurrens*.

And so it goes, with many other species being called cedar with or without further qualification. It is easy to see that common names haven't kept up with the discovery of new species and are used rather indiscriminately.



Cedrus libani

But those who become acquainted with the distinctive true cedars will recognize them wherever they see them—in old British gardens, on the shores of Lake Geneva in Switzerland, by old French chateaux. A very good place to get to know them is the Tyler Arboretum.

After admiring the old cedar of Lebanon, look at the Atlas cedar and the blue Atlas cedar right beside it. You will see that they have both suffered considerable storm damage. The cedar of Lebanon has suffered very little. The men who cut up the broken branches said the cedar of Lebanon wood was hard, but that the wood of the Atlas cedars cut like cheese.

Take the road below the barn. On the left, as the road turns down the slope, is a young cedar of Lebanon. Its many staminate cones, beginning to dry in winter and early spring, will still contain pollen. Cross Rocky Run and continue up the hill through the Pine-tum. Bear to the left, skirting the rhododendrons, to the big field beyond. The field is planted with young cedars.

There is one deodar about 25 ft. high at the southwest end of the field. It is old enough to produce many staminate cones, but has not yet borne any seed cones. Farther along in the field to the northeast there are about a dozen young cedars of Lebanon and Atlas cedars of varying sizes. In another twenty-five years they will be making a beautiful grove.

On a mild winter day, this is a lovely walk, with a chance for some birding. The many conifers give a cheerful aspect to the brown fields. If you come from late January up until the middle of March, look, on your return journey, for the snowdrops and winter-aconite near the old cedar, below Lachford Hall, the Painters' old home. If there is snow on the ground, you will see animal and bird tracks. There is something to see throughout the whole year at the Tyler Arboretum.



by Gertrude S. Wister




Please Note:

The caption was left off the photo used on page 28 of the Nov./Dec. *Green Scene*. It should have read: The position of cones differ on spruce and fir trees. The Korean fir cones stand up as shown in the photo; the spruce cones hang down.

THE RAKE'S PROGRESS AT CREFELD STREET:

cleanup time
with a little help
from the broom

 by Patricia Steijn

After two years of horticultural school in Ambler, and 14 months of weekly work at Ernesta and Fred Ballard's garden in Chestnut Hill, there's one thing I sure know a lot about.

Brooms. Brooms and rakes. There was once a time when I wondered how a forest could ever build up so many layers of topsoil. Now I know. And believe me, anyone who is planning to build terraces, patios, or walkways had better consider the cleanup. It's easy to envision all the wonderful bloom and lush growth around it, but how many remember that 90% of their work is going to be getting the dried bloom and dead growth off it?

The Ballard's garden consists of a gazebo opening out onto a grassy flat about 40 ft. by 20 ft., surrounded by flagstone paths, edged with beds of rhododendrons, trees, and shrubs. To the right is a flagstone terrace that overlooks the woods. The woods begin at the edge of the terrace and continue down a slope to the Wissahickon. A lower grassy flat is surrounded by pebbled walkways, and an upper level has flower beds with dirt paths.

On the terrace many of the larger tropical plants are placed for the summer, surrounding with lush beauty the outdoor tables and chairs. In the center is a hole out of which grows a large three-trunked chestnut oak.

We all know what oak trees are like in the fall; one of the glories of those wind-swept days are the crisp brown leaves falling. But not everyone realizes that before the leaves drop, the acorns fall (or are thrown down by squirrels). Acorns seem to come in two year cycles. In years when the drop is good, they will almost cover the terrace between one Saturday and the next. Since oaks hold onto their leaves well into the winter, oak leaf cleanup lasts through November, December, and even during January you can still be doing the final rake-out of the beds.



drawing by Julie Baxendell

Before the oak leaves fall, come leaves from the tulip tree, dogwood, and sourwood and ash from the surrounding woods. So it's rake, rake, rake from September through January, and snow falls, melts, and you find still more leaves.

Leaves are best gathered with a good rake, and we've found that a plastic garbage can, with the leaves well-stomped, will hold an amount more than equal to sheet bundles, wheelbarrows, or baskets. (The trick is how you stomp. Hop in the garbage can, stomp around the edges, then hop out and pile more in.) Of course, all good gardeners should compost leaves. Oaks make a rich acid soil and though it may seem a lot of trouble to be hauling leaves up or down to one spot, once you get in the habit it's not that bad. Burning them seems to me to be a complete waste; the only nice thing that comes of it is the smell.

Well, everyone understands and deals with the fall leaf haul, but remember, a terrace shows up **everything**. In winter there is an unending rain of dead twigs and branches broken loose by the winds or snow. Spring rolls around in late April and May, and lo and behold, little wormy things appear all over the flagstones. No, there is no such thing as spontaneous generation from flagstone. They are oak tree blossoms. Long brown crumbly things you probably never noticed until you built your terrace. Do yourself a favor and use a soft broom for sweeping; it's much easier on the biceps. Anyway I have to say this for the blossoms, they stick to a broom quite nicely and easily roll up into neat little piles. Plus you can use them in hanging baskets (as sphagnum). Just don't let them get wet. Instantaneously they become a glucky, matted mess.

Speaking of messes, there's more to come from above. In early April two thousand things are going on. Weeds

are popping up. Hardy plants need transplanting. Ground needs breaking. And *Magnolia soulangeana* is in bloom. But not for long. Everyone oohs and ahs over them for about a week and breaks his neck over them for the next month. The petals have enough water in them it seems to become slimy even without the April showers. With rain they're disastrous. Needless to say that what a stiff broom misses, a rake misses too. I practically end up scraping them

Soon magnolias have another surprise, their fruit, which, far from being exotic as the name might suggest, are inedible, unusable, and immobile.

off with my fingernails. Dogwood petals fall around this time also, but, bless their little hearts, they shrivel into nothing and blow away.

By the end of May I go to sleep dreaming of monstrous vacuum cleaners modeled after Dumbo, the flying elephant, swooping down from the sky and sucking the terraces clean with one slluurrrppp! No such luck.

The next thing I spy on the ground is no less than tulip tree petals. I wasn't even aware they were blooming until the petals lie there, shriveled on the flagstone. Soon magnolias have another surprise, their fruit, which, far from being exotic as the name might suggest, are inedible, unusable, and immobile. That is to say their shape, a stiff 2½ in. crescent, does not roll, slide, or push with the broom.

Summer continues, with its hot, dry days, during which my major attention turns towards keeping all the potted plants alive—and the inevitable dead-heading of annual blooms. The sudden, if infrequent, thunder showers bring down twigs, diseased branches, bad fruit, and unfortunately the staked to-

matos, the corn, and the delphiniums.

Then comes August and with the first gusty weather the terrace is full of immature acorns, of all things. To my dismay the little buggers roll gleefully around in maddening circles with each draw of the broom. Too small to stay on the tree, too big to ignore, they are invariably just the right size to fit in the cracks between the flagstones, and there they end up, as if taunting me. With them drop more oak twigs to warn me that the next step is fall.

And so the summer eases over, and the cycle repeats itself. Little by little, on Crefeld Street come the yellow, then browns. Nothing sudden, violent or crimson yet. No, only when I walk in one day and notice a covering of smooth yellow tulip tree leaves in late August, do I sigh and admit the circle is closed.

But the first whiff of brisk air gives me new energy and seems to pick up one's spirits as well as the leaves. Every now and then I just stop, throw back my head in the wind, take a deep breath and gaze around me in awe. I know the next thing to come down from that sparkling blue sky will be the dogwood leaves, later the oak. But for the time being I thank my lucky stars that I'm not in an office somewhere, smile at the fragrance of apples and grapes wafting over, and return to my broom with renewed vigor.

Patricia Steijn's first contact with gardening came one summer when she worked as a labor contractor developing gardens for a landscape architect. She liked it so much she enrolled at the University of Delaware in plant sciences. Impatient with classroom work and itching to get back to working with plants and the soil, she left there and went to Temple University Ambler Campus School of Horticulture, where she received her associate's degree. During her schooling, she worked part-time as a gardener for the Ballards. At present, she is education coordinator at Morris Arboretum and works with high school students on independent study projects.

photo by Robert J. Salgado



Nancy J. Salgado's interest in plants began 10 years ago when she moved to a house with a good southern exposure. Now, in their Bucks County home, she has more than 100 plants ranging from cacti to ferns in their kitchen. She attributes their well being to excellent lighting. Nancy and her husband Robert spent the late fall planting a mini-forest of pine trees on their three acres.

davallia bullata mariesi

I've been growing a squirrel's foot fern for five years now and it's always been a pleasure. From a 4-in. pot in the spring of '69, the *Davallia bullata mariesi* has grown steadily until it is now a glorious 2-ft. sphere. Apart from its beautiful foliage, this particular plant has the added charm of brown fuzzy rhizomes, which do indeed resemble the feet of a squirrel. The fronds rise from these rhizomes and this is also the way to propagate it. When I bought the plant it was a piece of rhizome about the length of my index finger with six or eight fronds. As it grew, I changed its pot each year for three years and then put it into a wire basket. The basket isn't visible anymore as the rhizomes have now formed a basket of their own on top of the wire and moss that first held the plant. The squirrel's foot fern has never been a problem to grow, but it has been tricky to water and fertilize because it has as much bottom as top growth. There's no setting it down. But because it is its own container, so to speak, the plant isn't heavy. I hang mine over the kitchen sink on an elongated "s" hook, not worrying so much about the plant as I do about flooding the kitchen. It does respond well to daily washing, but doesn't sulk if you are lax. It will thrive in the summer garden (full shade) with such lavish care as daily watering, but can manage quite well with every two-three-four days inside during the growing season depending on the million things that watering and knowing-just-when always depend on. It does not seem to mind drying out. I fertilize it as I do all my house plants with a water soluble powder mixed not according to directions but half as strong, administered twice as often. It likes good house light and winter sun.

Nancy J. Salgado

classified ads

EARN MONEY by selling herbs at your spring fair. We will supply healthy herb plants in labeled peat pots. Send self-addressed, stamped envelope for price list. Ryder's Herb Farm, 30 McClelland Avenue, Pitman, NJ 08071.

Penn State University Grad. — Ornamental Nursery Management. Wishes permanent position. Ten years' experience grounds maintenance, nurseries, landscaping, tree work. Phone (215) OR 3-0450.

JOY ADAMSON PRINTS. African botanical subjects "Berkheya Spekeana" and "Delphinium Macrocentron." Each 12 x 19, individually signed by artist-author of *Born Free* books. \$10.00 each, payable to Elsa Wild Animal Appeal. Write Box HBS-1, c/o Pennsylvania Horticultural Society.

FERN HILL FARM DR. MARTIN POLE LIMA BEAN SEED. Certified True to Type and Germination Tested by New Jersey Department of Agriculture. Hand selected seed available from Fern Hill Farm, Jessup Mill Road, Clarksboro, NJ 08020, at \$1.00/pkt. (12 seeds) + 50¢ postage per order.

Wanted Customers for superior varieties such as *Acer rubrum*, *Cercidophyllum japonicum*, *Cryptomeria japonica*, *Enkianthus campanulata*, *Hydrangea quercifolia*, *Ilex glabra compacta*, *Ilex 'Nellie Stevens'*, *Juniperus chinensis sargent*, *Pinus densiflora umbraculifera*, *Stewartia pseudo-camelia*, *Styrax obassia*. All, and more available from Rose Valley Nurseries, 684 S. New Middletown Rd., Media, Pa 19063. Telephone Ben Palmer, TR 2-7206

AFRICAN VIOLETS—America's finest, including amazing Rhapsodies, plus scores of other varieties. Send for color catalog, 15¢. Illustrated Growing Aids Catalog, 25¢. FISCHER GREENHOUSES, Dept. PH, Linwood, NJ 08221.

LORD AND BURNHAM GREENHOUSES for the care, cultivation and protection of tender growing plants; painstakingly custom designed to your specific horticultural needs, flawlessly erected, and delivered on time every time. Inquiry welcome. QED, INC., Villanova, PA. 688-4825.

Hundreds of satisfied green tenants... From the plant people who build greenhouses... Not builders who are green about plants.

WANTED: Married gardener-caretaker for farm estate near Philadelphia. Experience in lawns and animals with farming background. Three-bedroom house on grounds available. Send resume with references to Box LS-1, Pennsylvania Horticultural Society.

Dwarf conifers, exotic maples, ornamental grasses, hardy bamboos, alpine, heath and heathers, sempervivums, iris, hostas and day-lilies. Over 5,000 different offered at nursery. Open weekends in winter. Call (215) 536-4027. If you can't visit, an extensive catalog of above available for 50¢. Palette Gardens, 26 W. Zionhill Road, Quakertown, PA 18951.

Advertising copy should be submitted 8 weeks before issue date: November, January, March, May, July, September. Minimum rate \$5.50 (covers up to 35 words). Additional words 20¢ each. Less 10% discount for two or more consecutive issues, using same copy. All copy should be accompanied by check made out to PENNSYLVANIA HORTICULTURAL SOCIETY and sent to Patricia M. Cain, THE GREEN SCENE, 325 Walnut Street, Philadelphia, PA 19106.

fuchsia bohnstedti

No other plant in my collection stimulates my excitement and anticipation as the fuchsia hybrid 'Gartenmeister Bohnstedt' on the eve of its bloom, for I know from experience that I will soon be well rewarded for the extra attention I have given it over the preceding months.

The *Fuchsia bohnstedti* is a triphylla hybrid, which distinguishes it markedly from its more common cousins. While some find the flower of the fuchsia species a bit garish, this hybrid produces clusters of simple, yet stunning, trumpet-shaped blooms, whose orange-coral shade is set off so brilliantly against the plant's reddish foliage. Moreover, whereas fuchsias generally require a period of dormancy in the fall and winter to revitalize, *F. bohnstedti* will bloom almost continuously under proper conditions.

Its cultural requirements are similar to those of many other house plants. Having thrived in a semi-shady garden location for the summer, the fuchsias are brought into the house, where side shoots and other ambitious stems are cut back to encourage a bushy growth habit. White flies can be a nuisance, and I wash the foliage thoroughly with warm, soapy water to eliminate them. I then place all my *F. bohnstedti* under artificial lights during the fall and winter months, but the plant will still maintain its appearance and bloom in a sunny window during this period. A regular winter watering schedule should be maintained; every two or three days is sufficient in my third floor "conservatory," a sunny room where night temperatures reach about 60°. This last factor is the crucial one, for a fuchsia needs a night temperature below 65° to set its blooms; usually, the sunny window location will provide this condition.

In the fall I take several softwood cuttings from older plants (*F. bohnstedti* are much appreciated as gifts), and rooting occurs easily in about three weeks. At this point I begin to give the young plants my closest attention. I carefully pinch out the first set of new leaves and, thereafter, every other set of leaves as they emerge, so that by the spring the plants have attained the full bushiness that I desire. The plants are then allowed to set buds, which they do profusely. And successive blooms only add grace to the plants' appearance, as the flower stems elongate to accommodate the new clusters that are borne. A truly magnificent showing.

J. Blaine Bonham



Plant grown by Mrs. J. Pancoast Reath

J. Blaine Bonham abandoned banking when he discovered house plants. At present, he is PHS director of educational and community activities. Bonham received his B.A. from Penn State. He attended Temple University Ambler Campus to study horticulture in the '73-'74 semester. He is continuing work toward his associate's degree in horticulture. Bonham has an extensive collection of house plants at his Chestnut Hill home.

Statement of Ownership Management and Circulation (Act of October 23, 1962; Section 4369, Title 39, United States Code).

1. Date of Filing: September 30, 1974. 2. Title of Publication: *The Green Scene*. 3. Frequency of Issue: bimonthly. 4-5. Location of Known Office of Publication and Headquarters: 325 Walnut Street, Philadelphia, Pa. 19106. 6. Names and Addresses of Publisher, Editor and Managing Editor: Publisher - Pennsylvania Horticultural Society, Philadelphia, Pa. 19106; Editor - Jean Byrne, 325 Walnut Street, Philadelphia, Pa. 19106; Managing Editor - Ernesta D. Ballard, 325 Walnut Street, Philadelphia, Pa. 19106. 7. Owner: The Pennsylvania Horticultural Society, Philadelphia, Pa. 19106. 8. Known bondholders, mortgages and other security holders holding one percent or more of total amount of bonds, mortgages or other securities: None. 9. Extent and Nature of Circulation:

	Average No. Copies Each Issue During Preceding 12 Mos.	Single Issue Nearest to Filing Date
A. Total No. Copies Printed (net press run)	5,772	5,770
B. Paid Circulation: Sales through dealers and carriers, street vendors and counter sales.	8	0
Mail subscriptions	5,164	5,444
C. Total Paid Circulation	5,172	5,444
D. Free Distribution (including samples) by Mail, Carrier, or other means:		
1. Samples, complimentary, and other free copies	47	50
2. Copies distributed to news agents but not sold	81	0
E. Total Distribution (sum of C and D)	5,216	5,494
F. Office Use, Left-Over, Unaccounted, Spoiled after Printing	556	206
G. Total (sum E and F should equal net press run in A)	5,772	5,700

I certify that the statements made by me above are correct and complete.

Jean Byrne, Editor





THE green scene

HORTICULTURE IN THE DELAWARE VALLEY

MARCH • APRIL • 1975

\$1.00

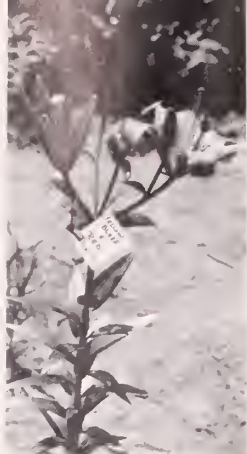
Julio L. Morris
22 W. Willow Grove Ave.
Philadelphia, Pa. 19118

A

Friends Hospital
Azalea Gardens



2



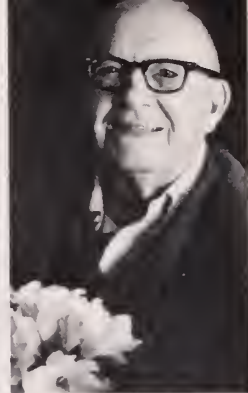
12



28



15



8



THE green scene

HORTICULTURE IN THE DELAWARE VALLEY

Volume 3, Number 4 Mar., Apr., 1975

published by
THE PENNSYLVANIA
HORTICULTURAL SOCIETY
325 Walnut Street, Philadelphia, Pa. 19106

Ernesta D. Ballard/*President*
Jean Byrne/*Editor*

PUBLICATIONS COMMITTEE

Craig S. Oliver/*Chairman*
George M. Harding
Nancy Howard
Robert S. Ryan
J. Franklin Styer
Dorothy Young

Patricia M. Cain/*Classified Advertising*
/Retail Distribution

Designer

Julie Baxendell
Baxendell Design Associates

THE GREEN SCENE, Volume 3, No. 4, published bimonthly, January, March, May, July, September, November, by the Pennsylvania Horticultural Society, a non-profit membership organization at 325 Walnut Street, Philadelphia, Pa. 19106. Subscription: \$5.00 — Single Copy: \$1.00. Second class postage paid at Philadelphia, Pa. 19104.

POSTMASTER: Send Form No. 3579 to THE GREEN SCENE, 325 Walnut Street, Philadelphia, Pa. 19106.

© Pennsylvania Horticultural Society, 1975

in this issue

- 1 Commentary *by John C. Wister*
- 2 The Azalea Gardens at Friends Hospital
by Richard Draper, 3rd
- 8 John Wister and His Rhododendrons
by Franklin H. West, M.D.
- 12 Let's Hybridize Lilies *by Wallace Windus*
- 15 Vines as Urban Garlands *by Gary Koller*
- 20 Books and the Green World: Travel
by Julie Morris
- 23 The Tyler Arboretum: Loveliest of Trees,
the Cherry
by Gertrude S. Wister
- 26 The Morris Arboretum: Chimonanthus
Praecox
by Susan B. Blum
- 28 Organic Gardening in Perspective
by Carolyn Thoroughgood
- 31 Growing Interests
- 32 Classified Advertising
- 33 Digging for Information *by Ed Lindemann*

Covers: Grounds at Friends Hospital. See story page 2.

Front and back cover photos by H. Richard Draper, 3rd



where can we get new plants for our gardens?

We seem to be at the end of the era when it was easy to get interesting new plants from large, general nurseries. The rush of the present day, and the vast changes in the modern business world, have forced both American and foreign nurseries to turn to mass production of fewer and fewer species and varieties. This brings up the question, "Where are we going to get the newer plants that we want to try?"

I have been thinking about this problem especially recently because I have been watching the struggle of two of the newest "Special Plant" societies, the American Magnolia Society and the International Lilac Society, which have been unable to grow large enough to be self-sustaining principally, I believe, because their members have been unable to get the new species and varieties that these societies have recommended.

The nurseries of today just do not have the plants the members want. There has not been enough demand in recent years to warrant their growing many magnolias or lilacs. It does not seem to me that there ever will be.

What to do?

Well, if we are at the end of one era, we must try to build a new and even greater gardening era.

The present difficulties of trying to find out where to buy new plants are neither new nor unique. During the past 50 years or more there has been particular interest in daffodils, hemerocallis, hostas, iris, lilies, peonies and rock garden plants (to mention just a few that I know about) that require little garden space. There has been interest, too, in larger growing plants like hollies and rhododendrons. Because general nurseries could not supply new varieties of these, special plant societies were formed to, among other things, make it easier for gardeners everywhere to get rare species and improved new varieties. As a result, specialty nurseries (backyard nurseries or hobby nurseries, whatever you want to call them) sprang up. They started very small. Most of them still are small although some few have in time

become quite large. Today gardeners everywhere can obtain hundreds and perhaps even thousands of plants new to them from hundreds of these newer specialty nurseries.

Many of these were started by amateur would-be plant-breeders, who then found they had surplus plants to dispose of. Plant breeding is a fascinating hobby that can be started by gardeners with little time or money (and in the case of the herbaceous plants mentioned, little room). The resulting herbaceous plants are easily propagated by division, are not heavy to handle, and can be mailed to friends or customers in small bundles or boxes. Iris, hemerocallis and hosta seedlings will often bloom in two or three years, so that a new generation of hybrids can be started. Hybrid seedlings of daffodils, lilacs and peonies will, of course, take longer to bloom, probably five years or more. This means that fewer new generations of hybrids may be sent on their way in the lifetime of the breeder.

That, however, has not prevented amateurs from starting holly and rhododendron nurseries . . .

It will also take five years or more for seedlings of hollies, rhododendrons, lilacs, magnolias and most other trees and shrubs to bloom so that a new generation can be started, and as the plants get larger they will require more room as the years go by.

A more serious matter for the breeder is that the resulting plants cannot be propagated by simple division but will have to be increased from layers, cuttings or grafts. Hollies and rhododendrons probably require more know-how and skill (and the use of special frames or even a greenhouse) than either lilacs or magnolias. That, however, has not prevented amateurs from starting holly and rhododendron nurseries, some of which have grown into quite sizable, commercial nurseries. It is, therefore, to be hoped that the magnolia and lilac societies can similarly inspire their members into starting specialty nurseries and thus

make new species and varieties that are not being produced in general nurseries once more available to gardeners.

This is but one part of what may be called a new gardening era. Nowadays seeds collected by botanical gardens, arboreta and by horticultural societies have become available to their members without cost or for only a very small fee to cover cost of handling and mailing. The oldest example that I know of a society offering this service is the Royal Horticultural Society of Great Britain, which every year sends its members a little booklet of 20 or more pages listing seeds of well over a 1,000 plants. There are similar but smaller services in this country offered by the American Horticultural Society, by the American Rock Garden Society, and by the American Rhododendron Society and other groups.

To raise plants successfully from these seeds will require time and a certain amount of knowledge and skill. Most of them are not as easy as marigolds or zinnias, but few of them present any real difficulty to experienced gardeners. Seeds of wild species collected in native habitats will reproduce the authentic species, but seeds from gardens may not always do so because they may have been hybridized by bees or even by the wind. Furthermore, perennial garden varieties (cultivated varieties, cultivars) will not come true to type from seed but must be propagated asexually from layers, cuttings or grafts. While that may not be easy for beginners to undertake, it should not be a real stumbling block to any really serious gardener.

Let us make the most of these new opportunities.

John C. Wister is an internationally recognized authority on flowering plants. He was director of the John J. Tyler Arboretum and the Arthur Hoyt Scott Foundation at Swarthmore College Foundation for many years. The Royal Horticultural Society of Great Britain dedicated its 1966 yearbook to Wister—the first time in its 77 year history the honor had gone to an American. For some idea of the man's achievements, see Franklin West's article on page 9.





At left:
Azalea under-
plantings
predominate
at the entrance
to the woods.

the AZALEA GARDENS at FRIENDS HOSPITAL



by H. Richard Draper, 3rd

One of the country's outstanding gardens is located at Friends Hospital in the Frankford section of northern Philadelphia. Founded in 1813 by the Society of Friends, it is the oldest private psychiatric hospital in America. The hospital grounds, approximately 99 acres of the original property, are on Roosevelt Boulevard (U.S. Route 1), directly across from Sears, Roebuck & Company. A generous strip of well landscaped grounds lies between the outer walls and the main buildings, insulating the hospital from the noise and fumes of heavy traffic on Roosevelt Boulevard. The beautiful plantings of azaleas fronting the Boulevard have often led passers-by to believe erroneously that they have seen the noted azalea gardens; actually the gardens lie behind the main buildings.

On the eastern boundary, the beautifully planted and maintained Oakland Cemetery extends the hospital plantings. The peaceful setting of the Cemetery helps to isolate the gardens from the residential and commercial development, which has all but filled that section of the city. To the south, the hospital is bounded by Tacony Creek and a section of one of the city's parks, a beautiful wooded area further extending the natural environment. A

wooded strip and a sunken railroad spur running up to the Sears warehouse complete the circle of buffer zones that help to create the illusion of removal from the city's jarring activity.

The gardens were originally planted to emphasize a dramatic spring display, although there are many other plantings of seasonal interest. The hospital opens its grounds to the public during the peak flowering period, from the last weekend in April through the first two weekends in May. Ordinarily, the grounds are only open to the public during the weekends, to maintain the patients' privacy and to ensure staff efficiency. Sometimes, however, special arrangements can be made for groups and individuals to visit the gardens during the week through the hospital's public relations office.

The main garden areas are located behind the main building, found at the center of the large semicircular drive leading to and from Roosevelt Boulevard. If for some reason you are unable to park and walk through the gardens, you may remain in your car and drive through them and then out the hospital's back gates onto Fisher's Lane.

A walk through the center of the main building takes you back to the

continued

Richard Draper until recently was a horticultural therapist at Friends Hospital. He is a graduate of the program at the Barnes Arboretum and has studied landscape design at Temple University, Ambler Campus. While an undergraduate at the College of Wooster, Draper worked between semesters at the Arthur Hoyt Scott Horticultural Foundation at Swarthmore College.

Broad areas of lawn border the woodlands behind Friends Hospital. Dogwood and azalea mark the line between the cultivated and the natural.



photos by author

It is said the first azaleas were plants that had been given as gifts to patients who chose to discard them.



early nineteenth century with its beautifully appointed reception and visiting areas, many furnished in period antiques. While the primary effort has been to keep up with modern advances psychiatrically, history is respected and the hospital has at the same time preserved the important contributions of the past. When stepping out onto the back porch, one is struck by the plantings of boxwood (*Buxus sempervirens*) leading down to a fountain and an attractive Victorian cottage beyond. Plantings of horse chestnut (*Aesculus hippocastanum*), crab apples (*Malus* sp.), Japanese flowering cherries (*Prunus serrulata*), hardy orange (*Poncirus trifoliata*), dogwood (*Cornus florida*), magnolia (*Magnolia soulangeana*), and pears (*Pyrus communis*) surround you. Broad lawns lead off in several directions, all edged in masses of well grown azaleas. The azaleas have been planted in drifts of similar shades, which makes for the bold statements of color that you find here. As you walk into the landscaped areas you are constantly struck by the way in which the plantings lead your eyes on to yet another vista and, once into that area, how other vistas open to your left and right. At no time do you feel you are in the city; the illusion is that you are somewhere in the country and that a well-tended estate has been opened for your scrutiny and pleasure.

Approximately 38 varieties of azaleas are to be found in the garden, most of them readily available in garden centers and nurseries in the Philadelphia area. Plantings of Hiryu Azalea (*Rhododendron obtusum*), its many varieties and hybrids, *Rhododendron x keiskei*, Knapp Hill and Exbury Hybrid Azaleas, Kurume

Hybrid Azaleas, Gable Hybrid Azaleas, the so-called Kaempferi Hybrids and many others are well represented on the grounds. But I must emphasize that this is not a particularly noteworthy collection of azaleas in terms of rare collectables, but rather a garden of hardy, reliable varieties well-suited for the area. It is the design of the garden that is noteworthy: its use of hills for staging, the broad expanses of lush green lawns setting the cultivated and wooded areas, and the thought given to drifts of similar colors with some irregularities to give the whole a more natural look. It is also obvious to one familiar with horticulture that there was in the design a knowledge of plants and how they would look as mature plants. The garden does not appear overplanted as one might expect many recently planted gardens to appear some 40 years hence. In this garden the use of a magenta-colored form, often difficult to blend with other colors, is successful because it is isolated from all other forms but white. One very large hillside is covered with the magenta azaleas interspersed with white azaleas and white dogwoods. The background on both sides and the top of the hill is planted with silver-bell trees (*Halesia carolina*), weeping willow (*Salix babylonica*), Austrian pine (*Pinus nigra*), white pine (*Pinus strobus*) and other deciduous and evergreen trees and shrubs, which successfully set the planting off from what lies around. At the base of the hill you will find a small stream with pussy willows (*Salix discolor*) and an abundance of watercress (*Nasturtium officinale*). On the other side of the stream a rough fencing and a small roadway visually sepa-

continued

Formal plantings of English boxwood lead away from the main building toward the woodlands.



In terms of the most refined horticulture and color sense, it is an almost garish display, lacking the sophistication of the plantings at Winterthur and other similar gardens, but it would be difficult to find a more lavish display of color, anywhere.

rate the magenta-colored plantings from the large drifts of different colored azaleas on the hillside leading up to another broad expanse of lawn.

An upper roadway gives the observer an excellent overview of the central plantings; paths lead off from these plantings into the large wooded area in the back of the property. The edges of the main wooded area are planted in drifts of pink, red, and white azaleas. From these peripheral plantings you walk on into areas of tall trees, some undergrowth, and many interesting plantings of the more than 50 species of wild flowers found on the grounds. Wildlife of all sorts abound there: rabbits, squirrels, raccoons, muskrats, box turtles, an occasional white-tailed deer, and more than 70 species of birds have been observed within recent years.

The present plantings were primarily made at the direction of Henry Hall, business administrator from 1897-1947; he ordered the first plantings in 1929. It is said the first azaleas were plants that had been given as gifts to patients who chose to discard them. Many cuttings were taken from these plant donations and then added to those already on the grounds. Some purchases were also made to add to the variety, which had remained somewhat limited.

Edith Hall, the daughter of the late Henry Hall, told me recently that her father worked closely with Samuel Pennock, wholesale florist, who was chairman of the grounds committee. Pennock, according to Ms. Hall, was responsible for pursuing the idea of large drifts of single colors and a random arrangement of colors. Pennock's idea of planting was followed, according to Ms. Hall, with the exception of

the magenta-colored azaleas, which her father felt should be isolated. Pennock and Hall were able to follow through in such a way as to create the dazzling display we enjoy today. In terms of the most refined horticulture and color sense, it is an almost garish display, lacking the sophistication of the plantings at Winterthur and other similar gardens, but it would be difficult to find a more lavish display of color, anywhere.

In 1938 the grounds were opened for public inspection for the first time. The number of visitors increased almost yearly; in 1974 an estimated 20,000 visitors viewed the gardens.

There remains the problem of the Northeast Freeway. This highway would not endanger the main hospital buildings, but it would effectively destroy at least 32 acres of the hospital grounds. The central concentration of the azalea plantings would be destroyed. The azaleas could in many cases be replanted, but the fact remains that the effectiveness of the garden depends on the relation of open spaces to planted and natural wooded areas. The plantings would also be diminished in value as part of a therapeutic setting for patients by the invasion of a superhighway. As they stand today, the gardens are an important adjunct to the therapies available through the hospital's many programs. In fact, the setting is unique among institutions of this kind. They are not only an important part of the therapy program; they give the hospital an effective public relations vehicle for relating to the general public by illustrating via positive news media coverage and promotion, an appealing and non-threatening aspect of psychiatric treatment.

OPEN HOUSE AT FRIENDS HOSPITAL WILL BE HELD THREE WEEKENDS THIS YEAR: April 26 & 27, May 3 & 4 and May 10 & 11, from 11 a.m. to dusk.

A donation of \$1/car is asked to help defray the cost of having the grounds open and to contribute to the cost of maintenance.

Azaleas and other plants, as well as craft items and refreshments, will be sold to benefit the patients and for grounds improvement.

Friends Hospital is easily reached by car as well as by public transportation. The SEPTA buses—Routes J, K, R, the Boulevard Express and the new FOX line—all stop at the hospital gates.

Friends Hospital received a 1974 Landscape Horticulture Award of the Greater Philadelphia Chamber of Commerce in cooperation with PHS. The citation read: For grounds maintenance far beyond the minimum required for neatness; for a spectacular display of azaleas; and for landscaping appropriately geared to maximum use and enjoyment of the hospital population.



by Franklin H. West, M.D.

Franklin West is a psychiatrist whose avocation is gardening. His specialty is azaleas (see *The Green Scene*, March '74). At present, West is assembling a book on five important hybridizers of rhododendrons and azaleas bred for the East Coast. Target publication date is 1976—in time for the national American Rhododendron Society meeting in May that year. Two of the profiles are already in hand: the first on Tony Shamarello, an Ohio nurseryman, written by Alfred Martin, and one on Dexter written by John Wister and Heman Howard. The book will also include the results of a survey of the ARS members showing what they grow and what they like best.



John Wister and His Rhododendrons

The above title could mislead you into thinking that rhododendrons claim Dr. John's greatest devotion.

They are very important to him, for sure, but they are only a segment of his widely ranging horticultural interests. The 1966 Daffodil Yearbook of the Royal Horticultural Society was dedicated to him, and in it was a heartfelt tribute from his late friend, Harry Randall, who had tried to find out whether it was peonies, iris, roses, hemerocallis, daffodils, rhododendrons, cherries, magnolias, crabapples, lilacs, or deciduous azaleas that were John's first love.

"I have not yet discovered which

genus pleases him most, all I know is that whatever I talk to him about, I have the feeling I am talking to a walking encyclopedia with a bounding enthusiasm."

Take a look at the highlights of Dr. John C. Wister's career, starting with his founding of the American Iris Society in 1920, his secretaryship of the American Rose Society from 1920-23, to the gold medals from the Iris Society, Daffodil Society, Rhododendron Society, the Massachusetts Horticultural Society, the Pennsylvania Horticultural Society, the Liberty Hyde Bailey Medal from the American Horticultural Society, his honorary

Doctor of Science degree from Swarthmore College, his recent award from the Lilac Society, his directorships of the Scott Foundation of Swarthmore College and the Tyler Arboretum at Lima, Pa., and his service as registrar of plant names for iris, hollies, and lilacs. It is obvious that he didn't fall victim to the malady that affects too many of the rest of us: the exclusive preference for one plant group. Those so afflicted cheat themselves out of all the delights and rewards that Dr. Wister has enjoyed from "playing the field."

Dr. Wister is a gentle man, with an enthusiasm for plant lore that is very contagious. He always shares his interests with great generosity and a friendly modesty that is often baffling. For instance, in telling about the beginning of the Dexter Study Committee, he allowed that he felt very pleased that Dr. Clem Bowers asked him to join the group. He told Dr. Bowers he didn't know anything about rhododendrons, so he doubted he would be very useful. Dr. Bowers retorted that he'd soon learn. "The question is," Dr. Wister asked 25 years later, "did I?"

Another time, in response to some compliments about his June blooming hybrids, he responded with, "But are they any good?" It's difficult to know how to respond to such a question except to study his plants carefully enough to give an informed answer. This was exactly what he had in mind all along: to get rhododendron people interested and involved in finding the answers to problems such as, "Are they any good?" This challenge could lead to useful regional evaluations both of the Dexters he helped select and his own hybrids about which he is so modest.

Many Philadelphians are aware that the Wister name has been a distinguished one in that city for many generations. The first of the family, Caspar Wistar, came from a little village near Heidelberg in 1717. He spelled his last name with an "a". His brother, John, who followed him in 1722, spelled it with an "e".

They first lived near the corner of

Third and Market Streets, and later John built his home, "Grumblethorpe," in Germantown where it still stands. A descendant of Caspar was the famous anatomist of the University of Pennsylvania for whom the Wistaria was named. The best known descendant of John was Owen Wister, author of *The Virginian*.

It is obvious that he didn't fall victim to the malady that affects too many of the rest of us: the exclusive preference for one plant group.

Our John also was descended from the original, but he was named John Caspar Wister, for both brothers. He grew up in a typical Germantown 19th Century country place of 10 acres, about a mile east of "Grumblethorpe." Because it had both woodland and open fields, horses, cows and chickens, and a big vegetable garden, he liked to

and after they bloomed, he saved the seeds for the next year. Then he planted ageratum and nasturtium, and in the early autumn made cuttings of these to grow over winter in the greenhouse, and was fascinated that they rooted in about a week.

There were tall rhododendrons hardly 200 feet from the greenhouse. His grandmother had seen them at the Centennial Exposition in 1876 and purchased plants from Anthony Waterer. But he paid no attention to them because he said he would never be able to have any plants—they might cost a dollar apiece while he could raise a hundred or more ageratum from a five cent packet!

It wasn't until 1929 that his earnings from designing and planting a garden of 120,000 iris at the famous Z. G. Simmons estate in Greenwich, Connecticut, made him feel rich enough to buy a set of "Ironclads" from Andorra Nursery: 'Album Elegans,' 'Charles Bagley,' 'Everestianum,' and many



'Snow Shimmer' is one of Wister's most spectacular hybrids, a cross of *R. fortunei* x *R. discolor*. It blooms about June 8-10, when most everything else is finished blooming. The flowers are huge, and the display of the white trusses is dazzling. The plant grows to 8 ft. tall and 10 ft. across in 15 years.

think of it as a "farm." His special interest in flowers began when he was about ten. Next to the vegetable garden his mother had a patch of brilliant annuals and a small greenhouse of potted plants cared for by an old gardener. He liked to follow the man around and watch him sow seeds and make cuttings. Before long he wanted to try it himself. He planted balsam,

others. By this time, he had visited the Dexter Estate in Sandwich, Massachusetts, with its designer, Paul Frost, his Harvard 1909 classmate in Landscape Architecture. Dr. John was greatly impressed by the rhododendrons, but believed the varieties were too tender to survive the cold Pennsylvania winters. A little after that he had met Mr. Dexter, but unfortunately so

continued

briefly that he formed no clear impression of the man who remains so much of an enigma as a person to this day.

Clement Bowers and Henry Skinner really got John Wister started in a serious way when they asked him to join the Dexter Selection Committee in 1949. By this time he had been adding plants to his own rhododendron collection for almost twenty years, mostly from eastern sources such as Andorra Nursery, Koster's Nursery and Joseph B. Gable.

Bowers, Skinner, Paul Vossberg, Donald Wyman, and John Wister made their first trip as a committee in the spring of 1949. At the New York Botanical Garden they were at once struck by one Dexter plant which they tagged No. 1, and which Vossberg later named Scintillation. This variety still plays a very big part in stimulating tremendous interest in the Committee's selections of the finer Dexter hybrids. Plants were also tagged and numbered that spring on Long Island at the two Phipps' estates and at Mr. Parker's and at Mr. Everitt's. Later in the year, Paul Vossberg was given permission to gather cuttings from these selections. He rooted them at the Westbury Rose Company greenhouse.

In 1950 the Dexter Committee went to Sandwich and, surprisingly, only made fourteen selections. Henry Skinner held them down to that number by being very, very particular. His insistence on only the very best helped keep the final list of selections to a reasonable length. The propagation that year was done at Arnold Arboretum and, unfortunately, only three of the fourteen chosen were rooted. By the following year the plants had been sold and shipped away so the other eleven selections were lost.

Dr. Wister persuaded Mrs. Arthur Hoyt Scott to employ Paul Vossberg to propagate cuttings of the Committee's Dexter selections for the Scott Foundation plantings at Swarthmore. In this way, Swarthmore College and later Tyler Arboretum developed the largest collection of Dexters until Heman Howard began reassembling all of the clones back at the Dexter Estate, now the Heritage Plantation of



photos by author

'June Achievement' is a cross of *R. maximum* x *R. discolor*. It blooms about June 17. It has an interesting reddish new growth, fine large flowers with a faint ochre blotch in the throat on a large plant that tends to bloom heavily every other year. 'June Achievement' is the sister of 'Frontier,' but is even better.

the Lilly Foundation at Sandwich, Mass.

But before all this, Dr. John had guided Mrs. Scott's purchase of nine groups of Dexter seedlings, 120 plants in all, from Mrs. Dexter in 1945. Two groups of those seedlings proved to be unique: one, because they were mostly so very red, the other because they were so very late blooming. Apparently no one else got either of these.

The red set was numbered 12507 at Swarthmore. From it came 'Acclaim,' 'Dorothy Russell,' 'Todmorden,' and many others. All of the 12507 set were hybrids of 'Pygmalion' x *haematodes* x Dexter No. 8. (Number 8 was supposed to be the species *fortunei*, but was probably a hybrid of *fortunei* with *decorum*.)

"I went on the theory that a British iris breeder once explained to me. He said to cross one thing I liked with another thing I liked, and if I was lucky I might come up with something I liked."

The other and very late blooming Dexter set was composed of seedlings of 'Lady Eleanor Cathcart' x *decorum* and was numbered 12506 at Swarthmore. 'Lady Eleanor Cathcart' was a Waterer hybrid of *maximum* x *arbo-reum*. As Dr. Wister put it: "It seems

strange that we got two batches of seedlings nobody else got, but since Mr. Dexter didn't have any systematic plan of hybridizing that we could figure out, I guess it was pure luck on Mrs. Scott's part that we got them."

Most of the other lots were tender, but the plants of one beautiful, fast-growing group of early fragrant pale pink *fortunei* were numbered 12499. A later flowering group of rose pink, of more compact plants that weren't fragrant, were numbered 12500. 'Madison Hill' is one of them.

"I started taking propagations of these Dexters to the Tyler Arboretum about 1953—first in nursery areas in the north woods, and more each year afterward until we filled that area and had to start the larger, new planting near the Pinetum.

"In 1951-52 the Bowers Committee, plus David Leach and Edmund Amateis, went to the two Moseley estates in Newburyport and Ipswich. Mr. Benjamin Moseley had sent a propagator down to Sandwich to take cuttings from selected plants instead of getting seedlings from Mr. Dexter, and his garden had a full grown set of these. We numbered them B. P. Moseley Nos. 1-10; then at the Mrs. Frederick Moseley's we numbered Nos. 11-17; and then at Mr. H. W. Fowle's, who had been one of the Moseley's gardeners, we numbered Nos. 18, 19, 20. All of

these were especially fine things. At the nearby property of Dr. George Clark, we numbered two particularly fine hybrids of *smirnowi* x *fortunei* but unfortunately we did not get cuttings of these later. In all we visited sixteen gardens that had Dexter plants and from which the first sixty Dexter selections came.

"Our Committee had a good time and picked only the best of what we saw. There wasn't any formal procedure or vote taken. The naming of the plants was left up to me to do later with the help of Heman Howard. I could never get the Committee together again to study their selections here, although members did come individually to see them, as did Joseph Gable and many others.

"Our hybridizing began here in 1953 when I had an Ambler graduate, Joan Higginbotham, help me at the Scott Foundation. She made all those crosses under my guidance. Mary Green, former librarian of the Pennsylvania Horticultural Society made more in 1957 and 1958. In 1962 and 1963 Fairman Jayne and George Hewitt made crosses. What I wanted was something late to fill the gap between June 1 and 20 to provide a floral display at Commencement time. I went on the theory that a British iris breeder once explained to me. He said to cross one thing I liked with another thing I liked, and if I was lucky I might come up with something I liked.

"We used the No. 12506 Dexters, and two *maximum-discolor* hybrids from Nearing and Gable, and other late blooming sorts like 'Maximum Roseum,' and *discolor* and *maximum* themselves. We saved pollen from May-blooming sorts, particularly reds and deep pinks to add some color to these later ones. We repeated the *maximum-discolor* cross many times on many different plants. We were successful in reaching our main objective, but no one knows yet if they're any good or not. I believe they will be useful for further breeding. Gertrude suspects that they may be better than Clem Bowers' late bloomers because they have larger flowers. We need to put more colors into them, and more fra-

grance, and more compactness. But since there's no money in this, it will have to be through amateur breeders that further development will occur. June blooming rhododendron plants will never be commercially successful, or at least many nurserymen say that, and I'm inclined to agree. But for the hobbyist, these plants can add four or five more weeks of bloom in his garden. I do wish more of our rhododendron people would do breeding. If enough do, some of them are bound to produce good things. People like Joe Gable don't come along often enough, but who can tell?"

"But since there's no money in this, it will have to be through amateur breeders that further development will occur."

Dr. Wister has hesitated to nominate those Dexter plants or his own hybrids that he regards as best, because he believes they have not been sufficiently tested and evaluated. He consented to name many of them so they could be distributed and evaluated more easily. Recently rooted cuttings of both groups have been made available to members of several eastern chapters. Here are a few possibilities that could prove to have outstanding merit:

DEXTERS (Dr. Wister's suggestions; all bloom mid-May except as noted.)

'Acclaim' (12507-12) glowing red
'Accomac' (12507-1) deep red
'Ben Mosely' (BPP Mosely 51-6) lavender, with dark blotch
'Champagne' (NY No. 2) pale yellow
'Gi Gi' (Ross GG) freckled rose red
'Glenda Farrell' (Ross RR) rose red
'Josephine Everitt' (Everitt No. 5) pink
'Lady of June' (12506-5 or 12) glossy leaves, large plant, pale pink, 6/25
'Madison Hill' (12500-2) rather compact plant, lovely pink truss, 5/25
'Newburyport Beauty' (Fowle 18) pink
'Scintillation' (NY No. 1-NYBG No. 67) pink, green blotch, splendid foliage

'Skerryvore Monarch' (Beinecke-Young 59-49) rose pink
'Skyglow' (Dexter No. 9) pinkish yellow
'Todmorden' (Scott No. 1) early deep reddish pink fading rose pink, 5/10
'Westbury' (H. Phipps No. 3) frilled pink

WISTER'S (Author's selection, blooming dates at Swarthmore)

'Delayed Event' (*maximum* x 'Dr. Dresselhuys') compact bright pink truss showing *catawbiense* influence 6/2
'Fairmont Lodge' ('Andorra pink' x 'H. W. Sargent') rose red, compact truss on tall plant 6/25
'Frontier' (*maximum* x *discolor*) new foliage bronze, pink bud, pale *discolor* type flowers 6/25
'High Hope' (*discolor* x *fortunei*) pure white 6/25
'High Regard' (*discolor* x *fortunei*) faint pink 6/25
'July Possibility' (*maximum* x Andorra pink') pale pink, medium-sized flowers 6/18
'June Fire' [(*catawbiense* x *discolor*) x (*fortunei* x *griersonianum* x *discolor*)] glowing red 5/25
'June Maid' (*maximum* x *discolor*) pure white, tight large globe-shaped truss 6/18
'Peach Brandy' (Scintillation x *haematodes*) apricot-peach 5/25
'Snow Shimmer' (*R. fortunei* x *R. discolor*) lily-white flowers, loose truss 6/11, truly "fills the gap"
'Sparkling Jewel' (*discolor* x *fortunei*) huge white open flowers with yellow throats 6/11, dazzling show
'Summer Jewel' (*maximum* x *discolor* x *discolor*) large latest flowered white 7/4, like *discolor*, blooms later 58-297A (unnamed) medium compact plant, excellent foliage with brilliant rose red trusses showing some *maximum* influence 6/2

There are many more Wister hybrids growing quietly among the thousands of rhododendrons at Tyler Arboretum, waiting for discovery and recognition. Next time you are in Delaware County in May, June, or early July, do visit and help us select the best of these.

More has happened to lilies in the last 40 years than in previous recorded history and much of it has taken place in the United States and Canada. While important contributions have come from abroad, there is little doubt that our countries now lead the world by a wide margin in the number of desirable new hybrid lilies in every horticultural division.

photos by Henry Beracha



Figure 1. Emasculation

let's hybridize lilies

Since he retired, Wallace Windus has so expanded hybridizing and raising lilies from seed that they have overflowed to the properties of two friends living 13 miles away. He has recently added daffodils to his garden. Windus is past president of the North American Lily Society, Inc.

If you would like to shock your horticultural friends let nature do your lily hybridizing. There is no law against it and the bees, moths and even hummingbirds will assure an abundant yield of seed. Of course, you won't know which pollen parent produced that attractive seedling and your curiosity may be aroused. Then you will start making controlled crosses.

Lilies provide the ideal flower for a beginner. No tweezers, scissors or microscope are necessary. All parts are large and widely separated. Even the biggest and most awkward fingers can do each step without difficulty and everything can be completed at one time. Then you simply wait and hope that the cross was successful.

There are four fundamental steps in hybridizing: (1) emasculation of the flower, (2) pollination, (3) protection,

(4) labeling. See Figures 1 through 4.

Emasculation. As shown in Figure 1 the flower is forced open shortly before it is ready to open naturally. The stamens, consisting of the filaments and anthers, are removed, as shown in Figure 2. That is done to avoid the possibility of self-pollination. Alternatively, one can get up at daybreak, when many lily flowers open, and carry out the procedure before the anthers open to shed their pollen (dehisce). One has a leeway of a little more than an hour.

Pollination. Pollen is applied to the seed parent by rubbing an anther on the stigma, holding the stamen by the filament, as illustrated in Figure 3. Pollen can be air-dried and used for two or three weeks before it loses its viability. Freezing the dry pollen will usually maintain its viability for at

least a year.

Protection. The stigma is protected from further pollination by folding a small piece of aluminum foil over the stigma. This is shown completed in Figure 4.

Labeling. The cross is identified by writing the name of the seed parent first by the name of the pollen parent with a soft (waterproof) pencil. The tag is also shown in Figure 4. It is desirable to record the cross in a notebook.

That is all there is to it. What could be simpler? There are numerous variations and a few useful procedures for special problems, but this method is entirely adequate in the author's experience to produce more seed than can be handled.

The seed is harvested after the pod turns brown and shortly before, or just after, the end of the pod starts to open.

continued

Figure 2. Pollination





Figure 3. Protection



Figure 4. Labeling

It is shelled out, air-dried, bottled, capped tightly, labeled and stored in a refrigerator for early spring planting out-of-doors or, if preferred, earlier in a flat for raising under lights. Many Asiatics and trumpets start to bloom in one year.

There are several advantages to raising lilies from seed. It is an economical way to have many lilies whose bulbs are more expensive than those of daffodils or tulips. Disease is not transmitted in the seed so your seedlings are healthy and free of virus until infected from an outside source. Your own seedlings have the maximum opportunity to acclimate themselves to the environment you provide. Any lily that grows vigorously in your garden will undoubtedly grow exceptionally well in your whole geographical area. Last, but not least, you have the excitement of watching for the first flower to open and the satisfaction of having created something of your own.

It is curious that so little was done in hybridizing lilies until recently. More has happened to lilies in the last 40 years than in previous recorded history and much of it has taken place in the United States and Canada. While important contributions have come from abroad, there is little doubt that our countries now lead the world by a wide margin in the number of desirable new hybrid lilies in every horticultural division. But hybridizing is related to scientific research in that there is no end to progress and discoveries. New and better hybrids become commercially available every year.

It is wise for a beginner to confine his or her efforts to one horticultural division in which most of the hybrids are compatible. Fastest progress is usually made by crossing the newest and best hybrids. The amateur can choose objectives from among the easy Asiatics, the popular trumpets, the durable martagons or the difficult Orientals. To cite a few examples, we are excited about white Asiatics now coming on the market at the rate of one

or two clones a year. True pink Asiatics exist but are not on the market yet. Many of us are hybridizing for our own white and pink Asiatics. Trumpets are available in many colors and shapes, but hybridizing is going on to deepen and sun-proof the relatively new apricot color and to increase the hardiness of the bulbs. Greater resistance to hot weather and greater virus tolerance and rot resistance are being sought in the Oriental hybrids.

Lest an amateur become discouraged by getting the impression that everything has been done, it is worth mentioning three wide crosses made for the first time by advanced hobbyists in the last ten years. No special knowledge or tricks were involved, just curiosity and a will to try. The species cross of *L. alexandrae* x *L. speciosum* produced a beautiful medium pink fragrant Oriental hybrid for Ruth Clas of Albany, New York. It is being propagated commercially and used for further rewarding hybridizing. A cross involving martagon hybrids by *L. tsingtauense* was made independently and apparently simultaneously by the Honorable George C. Marler of Montreal and Ed Robinson of Wawanesa, Manitoba. This cross has yielded a number of vigorous hybrids in new shades. The latest sensation is the result of a cross between *L. candidum*, the Madonna Lily, as the seed parent and the fragrant yellow *L. monadelphum* as the pollen parent. This cream-colored beauty, originated by Charles Robinson of Erin, Ontario, causes oh's and ah's wherever exhibited. These three new horizons point the way and expand future hybridizing possibilities.

To broaden one's knowledge and to narrow and clarify one's objectives it is desirable to attend shows and join specialized societies. The local Middle Atlantic Regional Lily Group will have its show at the Pennsylvania Horticultural Society's headquarters on July 12-13, 1975, and the international North American Lily Society, Inc., will meet in Philadelphia July 8-11, 1976.



Wire supports protect these wisteria vines from strong winds. The vines enhance the parking lot on the corner of 3rd & Walnut Streets across from Society headquarters.

vines as urban garlands



by Gary Koller

Years have passed since I noticed the cold bleakness and inhuman architectural scale created by the endless paving and soaring walls of the urban landscape. What made the city so uninviting? After much thought, many questions and rewarding tours of attractive urban areas I realized that plants can visually and aesthetically transform an area. They soften harsh corners, blend

contrasting architecture, screen work and service areas and give shelter from intense sun.

Plantings are often neglected in redevelopment plans because plants take up space where every inch is valuable and highly taxed. If plants are to be used, space limitations would seem to dictate that they go vertical rather than horizontal. The need is for vertical

continued

Most vines seem to thrive in a limited volume of dry, compacted infertile soil. They display great resistance to drying winds, intense reflected heat and light and to moderate levels of air pollution. Most vines grow rapidly, are bothered by relatively few insects and diseases and have a remarkable ability to recuperate from abuse.

lawns! In seeking plants to fill this special requirement I realized that vines have unlimited potential to form walls and ceilings of living greenery.

Vines offer a rugged adaptability to harsh and uninviting planting areas; however, they have been totally neglected by landscape architects and are too often overlooked by urban horticulturists.

As a group, vines have many additional attributes, the greatest of which is that they are vigorous growers that prefer not to be pampered. Most seem to thrive in a limited volume of dry, compacted, infertile soil. They display great resistance to drying winds, intense reflected heat and light and to moderate levels of air pollution. Most vines grow rapidly, are bothered by relatively few insects and diseases and have a remarkable ability to recuperate from abuse. Once established, they need little care other than annual pruning.

Vines do have shortcomings. They have no discrimination as to what should and should not be covered and as a result walls, windows and sometimes roofs are hidden. Christopher Columbus' house in Genoa is only a "rumor" within a mammoth green mound. Rapid growth allows untidy branches resulting in a tangled mass and heavy growth can cause fences or other supports to collapse. In some cases, birds seek shelter in the mass of vegetation or insects are attracted by the flowers. Minimal attention in the form of periodic pruning will reduce or prevent these limitations.

Many people have said that vines should not be grown against walls because they deteriorate the masonry. I have been unable to find any factual study to document this claim. Root-like holdfasts of some vines cling to walls and during growth and attachment may dislodge bits of masonry. Although we don't know if substances given off by the plant would accelerate deterioration of the mortar, we do know that vines will widen preexisting cracks. Humidity is higher between the foliage surface and walls of the building covered; hence vines should never be used directly against wooden walls because the moisture will cause damage. Climbing plants can be used in this

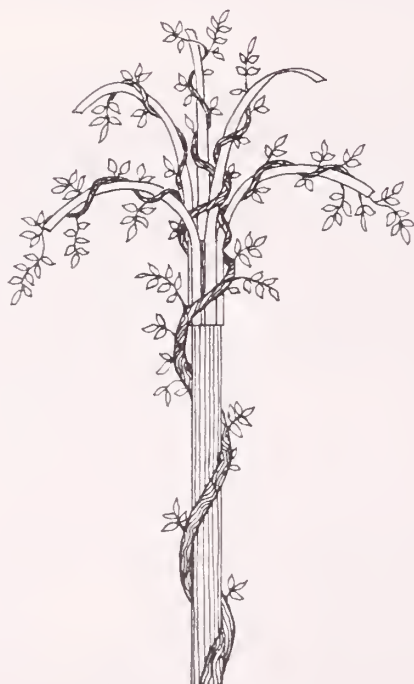
situation if a support or trellis is built 1 to 2 ft. from the wall allowing space for air circulation.

Plants that cling form their own attachment devices; however, during periods of ice and strong winds clinging vines may be torn loose from walls. To prevent this some form of additional support or attachment may be needed. Eyebolts embedded in the masonry and laced with wire should be quite adequate, but it is essential that there be no water leakage around the eyebolts, especially in stucco. The accompanying photograph of a heart shows what a romantic couple in northern Scotland did with *Hedera helix*.

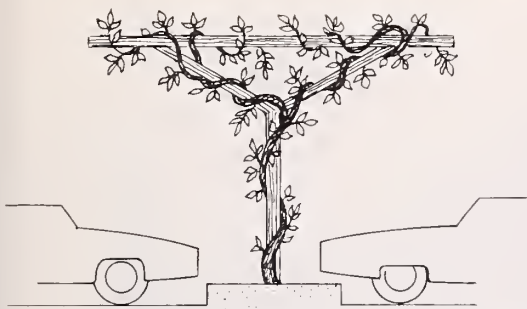
Vines that twist and twine need an arbor or trellis. These supports can be made of a wide range of materials including wood, metal and wire. Vines adapt to an infinite variety of sizes and shapes limited only to the imagination of the designer.

A simple trellis in wide use today is the chain link fence which is less than attractive. Consider covering it with vines such as *Hedera helix*, *Euonymus fortunei* cultivars, or *Lonicera japonica*, which twist in and through the fence and in a short time completely cover and hide the support. Judicious pruning tightens up growth and the effect becomes that of a narrow hedge that can be maintained one or two feet wide. The English refer to this as a "fedge" and it is often seen in their landscape. The fedge provides privacy where a hedge would be too wide and a fence by itself is not desirable.

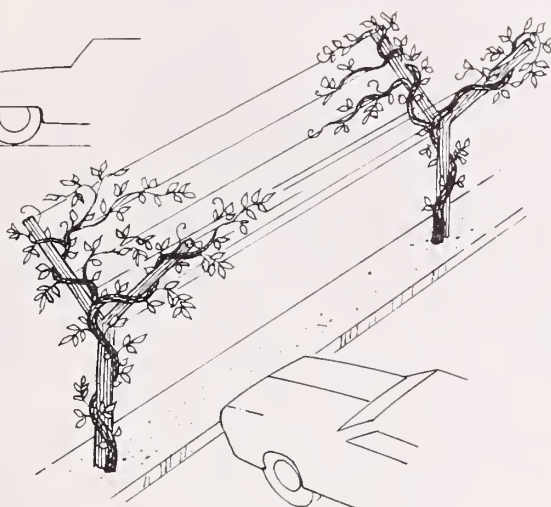
Stiff vertical lines of trellises can be easily adapted by allowing them to branch or spread, thereby providing a pleasing canopy effect. One way to achieve this effect is to use utility poles as uprights and attach gracefully arching metal arms to the upper end (sketch). Use three to five arms in a scale or proportion, which is in keeping with the size of the pole. Height can vary to fit the landscape situation or desired effect. As the vines reach the arms they will cover the framework and provide a tree-like shape. The vine *Campsis radicans* will achieve the same effect without the aid of support arms, for with age the upper growth bushes out naturally, creating a small, round-



Tree-shaped arbor.



Trellis in island of parking lot



Canopy arbor.

headed "tree."

Another variation can be achieved by spacing utility poles 10 to 15 ft. apart. Attach a single arm on either side at the top of each upright. Between the posts run two or three strands of heavy galvanized wire linking the arms. Vines growing here will eventually create a mantle of green spanning the gap between the posts (sketch). This can be done more simply by spacing sturdy upright supports 8 to 10 ft. apart and allowing a single strand of heavy chain to drape gracefully between them. Again you have an inexpensive but sturdy support.

A word of caution: do not use wood freshly treated with creosote because creosote is toxic to plants. Use utility poles that are well-weathered or which

continued

Boston ivy creates a green wall in Society Hill.





At left:
Vine trellis at Kew Gardens in
England.

At right:
A rose arbor is supported with
gracefully draped heavy chain.

Below:
Vitis sp. creates a leafy arbor for
shade, color and delicate summer
sounds at Planting Fields Arbo-
retum on Long Island.





have been treated with some other non-toxic material. Another problem will be keeping the posts upright. The weight of the vines tends to pull inward and guy wires, from the end posts to the ground, anchor and stabilize the support structure.

A ceiling or overhead canopy gives most people a sense of comfort and security. Arbors, which are essentially overhead plant supports, can be developed to span walks, sitting areas, or roadways. With a vegetative cover one has a sun shield in summer and, after the leaves have fallen, the same area is dappled with the warmth of a winter sun. People often wait years for a tree to shade a terrace or patio when an arbor and vine could give the same effect in a fraction of the time. Such a planting is especially delightful when there are fragrant or colorful flowers. To maximize or extend floral interest try mixing two vines with different bloom periods.

Narrow islands such as found in parking areas are always difficult to plant. Shrubs are too wide-spreading; trees will not have adequate growing space and are constantly subject to damage from automobiles. Vines and trellises provide an adaptable solution to a space with limited use. Trellis

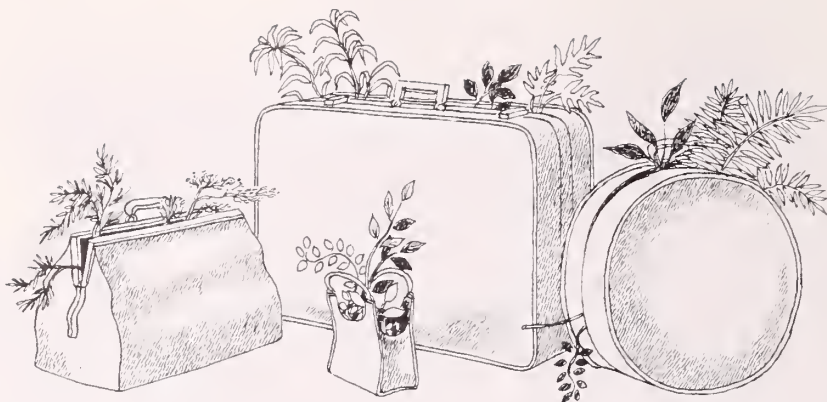
design can do much to eliminate the problems associated with wide bumper overhang. Here all that need be exposed are the main support posts, and these can be protected by well-placed bollards or other retaining structures. The main body of the trellis can begin at a point above the hood of the car so that a careless driver who pulls in too far will find that the hood slips beneath the lowermost arm or wire of the trellis.

Often there is no planting space at a location where a plant is needed. This can be remedied to some extent by planting a vine where space is available and then training it along a high support. If enough space is allowed, the structure along with its vine could traverse driveways or parking lanes.

Vines need not climb; some make excellent ground covers and others can be planted at the top of a wall and allowed to cascade over the edge. Massive retaining walls can be reduced visually using this technique.

Climbing plants provide cities with ways to help reduce their problems. Vines absorb noise, reduce glare, trap air-borne dust, soften harsh lines and bring a touch of natural scenery to the urban desert—all while requiring minimal space.

Gary Koller is curator of the Living Collection at the Morris Arboretum. A graduate of the Longwood Program of Ornamental Horticulture, Koller's primary interest is in woody plants and their use in the urban landscape.



TRAVEL

Many of our members extend their gardening interests to vacation plans. Late winter often finds a member surrounded by horticultural travel books, each promising to take the traveler to the right place for the right plant at the right time. Whether you want to see cyclamen in Greece at their moment of perfection, or the white garden at Sissinghurst (England) at its peak, there are books to guide your planning along the way. Many of these "travel" books are worth reading for themselves whether or not we take the trip to see the gardens mentioned.

Too often travel books include too little about too many places thus exhausting the reader and discouraging us from ever breaking in that pair of comfortable walking shoes we are inevitably admonished to buy.

In any event there are books to stimulate the reader and help the garden visitor. The books I've chosen are ones that in my opinion read well and contain useful information. Information such as the best modes of transportation, or the mention of a less notable garden that should be seen.

Travel books or guides take several forms. Euell Gibbons in his various *Stalking* books could be considered a travel guide, whether by backpack or canoe. Perhaps more botanical and gastronomical than horticultural, the Gibbons' tours would appeal to the more adventuresome.

Many of our members travel to the mountaintops of the world where few gardens exist. Their guides are often floras from the library's collection. Recent visitors to Greece, Spain and Portugal have used some of our illustrated floras that are more useful to travelers unfamiliar with keying out

plant material.

Guides to trees, shrubs, wildflowers and ferns are also plentiful and are often borrowed once the itinerary is planned and the books about specific gardens or locales have been perused.

The kinds of books mentioned so far are those that help after the trip has been planned. However, the books that are the main subjects of my article are those that help you to plan your trip.

The British Isles and gardens have become synonymous. *The English Garden* and *The Irish Garden* both by Edward Hyams show and tell the reasons why. They are handsome books in themselves with good illustrations of the high points in garden design. The best part of the two books is the detailed history of each garden. So, when you visit Sissinghurst, not only will you feel the presence and influence of Vita Sackville-West and her husband Harold Nicholson, but you will know how their estate evolved from its earliest recorded history.

The photograph of the Laburnum Arch at Bodnant typifies the English yearning for nature perfected in romantic tones. Hyams discusses the influence of Capability Brown and Humphrey Repton throughout his books, as well as the less flamboyant, but equally important, contributions of William Robinson, Gertrude Jekyll and their contemporaries.

In Peter Hunt's *The Shell Garden Book*, the author not only tells us which garden may be visited and when, but what to look for in each. The long history of gardening in Britain is related to the social and political history of the country for a more complete picture. The personalities

books and the green world



by Julie Morris

and foibles and the often dictatorial manner of the early designers toward their famous patrons add dimension and interest to any visit.

On from England to the rest of Europe with Dorothy McFadden. A chronological tour in pictures is presented in *Gardens of Europe: A Pictorial Guide*. A 15th century garden recreated in boxwood illustrates the planting around a royal palace in Portugal. If you want to visit a Tudor garden in Middlesex, or a 16th century chateau garden in the Loire Valley, McFadden is a successful guide, right up to the 20th century gardens at the Vatican in Rome. Descriptions of the gardens and directions for getting to them are important parts of the book, but the last half is especially interesting. It could be called the special features section. If you want to see only flowers, you will learn where to go. Specialized gardens like the Japanese gardens in Holland, or the rose gardens all over Europe, the cacti and succulent gardens in Zurich, and the Dahlia Arena in Essen, Germany, are pictured. If you've never seen a 12 ft. high espaliered geranium, there is one in a public greenhouse in Scotland. Gardens under glass provide sufficient variability in kind and location to warrant a tour alone. *Victoria regia* waterlilies grow in a German conservatory and special primroses bloom in an Italian greenhouse. Garden ornaments and oddities from gates to pebble mosaics are other subjects worthy of note.

Finally, water in the garden abounds throughout Europe and is skillfully documented in this book, a good companion to McFadden's more practical, *Touring the Gardens of*

Europe.

People visit gardens in America, too, as attested to by PHS's very successful garden tours. Books on American gardens are as good and complete as their foreign counterparts. While fewer in number the guides offer the same complete histories. Even though we have no 15th century gardens, we do have a heritage of at least 200 years, as well as some of the best modern gardens in the world.

Harry Logan and Martha Roberts in their respective books offer gardens and ideas for travel that will help in planning your trip. A recent book on the gardens of New England by Nicholas Zook reminds us that we don't have to go far to find gardens of importance.

Gardens of Colony and States offers a tour through time if not space. Many of the gardens pictured exist now on paper only. Fortunately, this chronicle remains through the efforts of the Garden Club of America and is an invaluable reference tool.

The Library's horticultural files contain information on most American public gardens as well as those of importance in Europe. The files are available for use in the Library. Many gardens worth visiting exist in the Delaware Valley and shouldn't be overlooked.

Books are available about almost any area where there are gardens, and the Library staff will be happy to look for appropriate information.

Finally, don't leave without first reading the two books by May T. Watts, *Reading the Landscape* and *Reading the Landscape in Europe*. You will be delighted by her style and wit, and you will learn a great deal

about the sociological and ecological adventures awaiting the traveler. Whether you want to know where the magnolia grows and why or how a Norway spruce reached a farmhouse in Illinois a hundred years ago, or how plants adapt to tundra life, Watts will not only supply the answers, but will make you want to know much more. Don't miss the cow-pruning section in chapter 7 of *Reading the Landscape*. It will give you something to look for as you cross the midwestern parts of this country. *Reading the Landscape in Europe* is a necessary primer for any traveler to foreign landscapes.

We visit gardens for many reasons: for ideas, for pleasure, for examples of horticultural perfection. A book can take us only so far; we can't smell the honeysuckle bower at Sissinghurst, or hear the water as it plays down the steps at Villa D'Este, or wonder at the clipped arches in Granada, but a well-written thoughtfully chosen book is almost the next best thing to being there.

21

book list

The English Garden
by Edward Hyams
Harry N. Abrams, Inc., New York, 1964

Italian Gardens
by Georgina Masson
Harry N. Abrams, New York, 1961

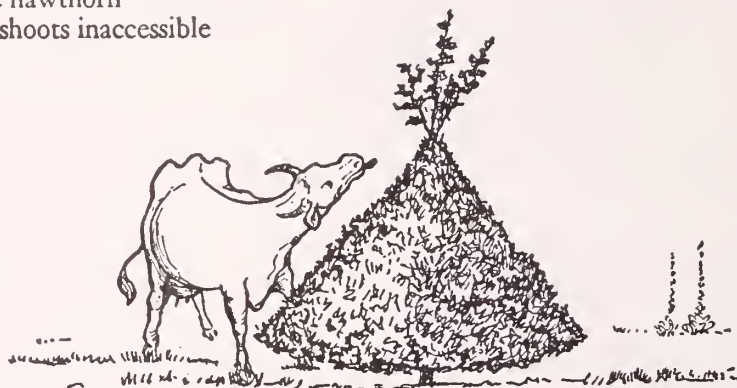
Gardens of China
by Oswald Siren
The Ronald Press Co., New York, 1948

Irish Gardens
by Edward Hyams
McDonald Press, London, 1967

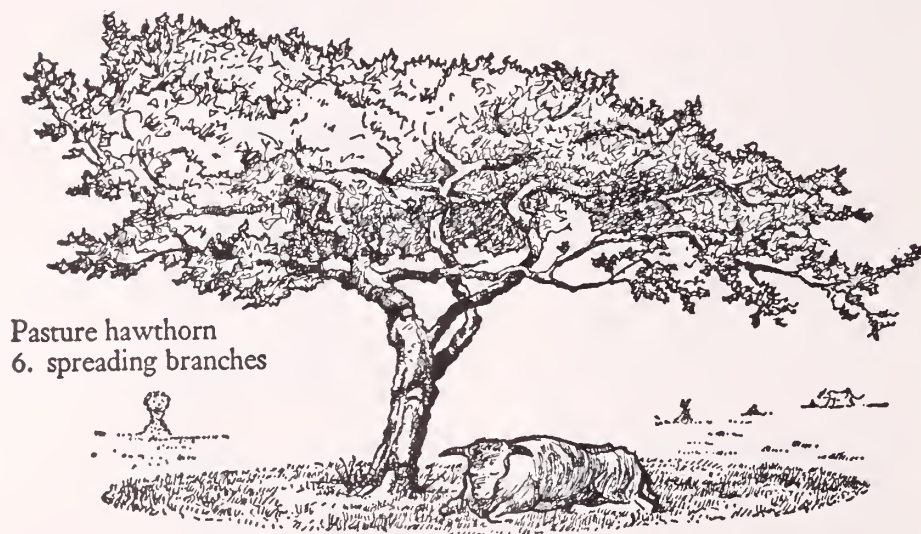
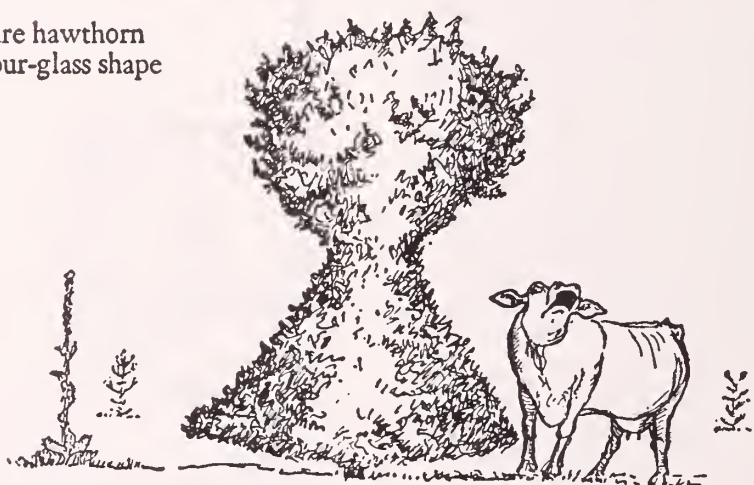
Stalking the Blue-Eyed Scallop
by Euell Gibbons
David McKay Co., Inc., 1964

continued

Pasture hawthorn
4. top shoots inaccessible



Pasture hawthorn
5. hour-glass shape



Pasture hawthorn
6. spreading branches

- Public Gardens and Arboretums of the United States*
by Martha McMullan Roberts
Holt, Rinehart, Winston, New York, 1962
- A Traveler's Guide to North American Gardens*
by Harry Britton Logan
Charles Scribner's and Sons, New York, 1974
- Gardens of Colony and State*
The Garden Club of America
Charles Scribner's and Sons, New York, 1934
- The Gardens of Europe: A Pictorial Tour*
by Dorothy L. McFadden
A. S. Barnes & Co., London, 1970
- Touring the Gardens of Europe: Descriptions and Directions*
by Dorothy L. McFadden
A. S. Barnes & Co., London, 1970
- The English Garden*
by Edward Hyams
Harry N. Abrams, Inc., New York, 1966
- The Shell Gardens Book*
ed. Peter Hunt
Phoenix House, London, 1964
- The World of the Japanese Garden*
by Lorraine Kuck
Walker, Weatherhill Co., New York, 1968
- Great Botanical Gardens of the World*
by Edward Hyams
Macmillan Co., New York, 1969
- Imperial Gardens of Japan*
by Takeji Iwamiya
Walker, Weatherhill Co., New York, 1970
- A Guide to the Gardens of New England Open to the Public*
by Nicholas Zook
Barre Publishers, Mass., 1973
- Reading the Landscape*
by May T. Watts
Macmillan Co., New York, 1963
- Reading the Landscape in Europe*
by May T. Watts
Harper and Row, New York, 1971
- Directory of American Horticulture*
The American Horticultural Society
Mt. Vernon, Va., 1974.

Illustration of cow-pruned hawthorns
from *Reading the Landscape, An Adventure
in Ecology*, by May Theilgaard Watts.



THE
TYLER ARBORETUM

515 Painter Road • Lima • PA 19060
Lo 6 5431

loveliest of trees, THE CHERRY



Close-up of *Prunus yedoensis* 'Yoshino'

It was of the white-flowered maz-
zard cherry, parent of our sweet
cherries, that A. E. Housman sang:

*Loveliest of trees, the cherry
now*

*Is hung with bloom along the
bough...*

But if you come to the Tyler Arbore-
tum in April, you will see cherries
decked in pale and deep pink as well,
with young leaves just expanding in
green, or bronzy green, or copper. The

trees are fairly smothered with bloom,
a glorious sight. They surround the
parking lot and edge the roadway
across from the fragrant garden. Near
them, the magnolias open their great
cup-like flowers, an interesting study
of texture compared to the fluffy
masses of cherry flowers.

The Painters did not know the
Japanese cherries that we grow today.
Their planting days were over by the
early 1870's, and it was not until
about 1890 that Japanese cherries
were brought to this country in suffi-
cient quantities to be important. For
many years, the nursery of A. E.
Wohlert in Narberth was an important

source of these trees.

A fine cherry collection was planted
by the Scott Foundation of Swarth-
more College in 1931, and our collec-
tion at Tyler was propagated from the
Swarthmore trees and planted during
the late 1940's. Most of them, there-
fore, are about a quarter of a century
old.

However, this collection of about
20 species and varieties was antedated
by three weeping cherries planted by
Mrs. Tyler about 1931, of which two

continued

remain. They are conspicuously placed against a background of pines and hemlocks near the junction of the path from the parking lot and the Arboretum drive. They were planted as fairly large specimens, and must be close to the half-century mark. They have been sadly buffeted by winds and crushed under ice and snow. Still they produce their showers of pink flowers every April, and we hope they will endure for many more springs.

The ancestry of the cultivated cherries is in part lost in the mists of antiquity. Those who wish to delve deep into the subject may consult Collingwood Ingram's *Ornamental Cherries*, Paul Russell's *Oriental Flowering Cherries*, and Ohwi's *Flora of Japan*. Clarification is not guaranteed.

As far as the gardener is concerned, the cherries grown for their flowers are divided into two main groups. The first group, most of them derived from *Prunus subhirtella*, blooms here during the first part of April, and the second group, derived chiefly from *Prunus serrulata*, blooms in the latter part of April. Their hybrid, *Prunus yedoensis*, blooms midway. The first group, including *Prunus incisa*, has very fine twigs, and the second group, including *Prunus sargentii*, has thicker twigs. *P. yedoensis* tends toward the latter group in texture.

I shall present these cherries in a formal way that is more easily followed than a rambling text.

the early flowering group

Fuji or Mame Cherry (*P. incisa*). Mame means dwarf. Flowers tiny, single white, but the red corollas influence the color effect. The small tree, or large bush, smothers itself in a haze of bloom. Used for bonsai.

Higan-zakura (*P. subhirtella*, Higan

cherry). The word zakura or sakura means cherry, and is often used in combination with the main part of the name. Having used it once, I shall from now on omit it. The typical Higan is usually seen as a small tree, but it can grow to 60 ft. or more, given a chance. The flowers vary from white to pale and medium pink, single.

Weeping Higans. There are several clones of these most popular of the early cherries. The best have the deepest color. Most are single, but there is a double. Usually they are grafted on a very high standard to get the pendulous top off the ground. If on their own roots, they should be staked until the trunk can support the top. They are a pretty sight in full bloom, but a brisk spring storm can shatter the flowers in a short time.

'Jugatsu' (*P. s. autumnalis*, autumn cherry). This Higan cherry is notable for its long season of bloom. The light pink semi-double flowers do not all open at the same time. Some open during warm spells in autumn and winter, but most of the bloom comes in spring, starting before the other Higan cherries, and continuing after they are over. It makes a rounded tree to about 30 ft.

We have also a small Higan cherry that blooms earlier than the others. I hope some day we shall have 'Momi-jigare,' a rare Higan cherry, rather dwarf, with semi-double flowers of a deeper color than the other Higan cherries. It's a beauty.

'Hally Jolivette.' This is a hybrid made by Dr. Karl Sax between *P. subhirtella* and *P. yedoensis*, crossed back on *P. subhirtella*. It is named for Mrs. Sax. It makes a broad, finely-twigged tree with semi-double pale flowers pinkish in the center that open over a period of about 20 days. This long flowering period and its habit of opening some flowers in fall and winter make me believe that 'Jugatsu' was the

selection of *P. subhirtella* used in making the cross.

midseason

'Yoshino' (*P. yedoensis*). This is the tree that fringes the Tidal Basin in Washington's Potomac Park. While the Japanese have been growing garden forms of cherries for hundreds of years, and cherries with double flowers have been known for over a thousand years, this cherry did not appear until about 1868. It is considered a hybrid between *P. subhirtella* and *P. serrulata*, and is treated as a hybrid species, usually coming true from seed. The beauty and vigor of 'Yoshino' have made it extremely popular. The double flowers open a soft pink, and in our sunny climate fade to white. It is used as a street tree in one of the Washington suburbs. Tall trees nearby have forced the trees into tall, open growth, and they turn the area into fairyland.

the late flowering group

'Amanogawa' (Milky Way). Flowers single to semi-double, pink, slightly fragrant, late. This is an accent tree, notable for its narrow upright shape.

'Fugenzo' (Goddess on a White Elephant). Known for over a thousand years. Often called 'James H. Veitch.' It has large rose-pink double flowers with two leafy carpels in center; its young leaves are coppery.

'Gijo' (Dancing Girl). Flowers large semi-double pale pink. Late.

'Hata' (Growing by Water). Flowers single white. Growth wand-like.

'Ichiyo' (One-leaved). Often a leafy carpel in the center of the double light pink flower. Young foliage greenish bronze.

'Kwanzan' (named for a Japanese mountain). Deep carmine in bud, flowers full double, rose-pink, droop-



Autumn Cherry 'Jugatsu'

single pink flowers in spring, and the leaves, brownish-red in spring, give the best autumn color of the flowering cherries when they turn to red and orange. The somewhat upright growth habit makes it a possible street tree. The wood is used in Japan for wood blocks for color printing.

The cultivars of flowering cherries must be propagated asexually, of course, and they are usually grafted on the understocks used for grafting the edible cherries. It would be better to graft them on seedlings of *P. serrulata*. Fruit, hard and inconspicuous, can usually be found on trees with single flowers, to produce this understock. Although some attractive trees may be grown from these seedlings, chances are that they will not amount to much. We do have several, however, in our collection.

Spring is considered the best time for transplanting. Like most of our garden plants, cherries should have well-drained sites with soil of average good quality.

Although, except for the Sargent cherry, fall color is not considered important, sometimes others of these cherries assume handsome tones of russet and mahogany. The bark, like that of many of the cherries, is also a modest attraction, polished and marked with horizontal lenticles.

But it is the wealth of flowers that enchants us. And having started my article with one poetic quotation, I end it with another, by Robert Bridges, which always comes to my mind in cherry blossom time:

*Awake! the land is scattered with
light, and see,
Uncanopied sleep is flying from
field and tree:
And blossoming boughs of April
in laughter shake;
Awake, O heart, to be loved,
awake, awake!*

ing. Young leaves copper red. Featured in the Potomac Park planting. This handsome, vigorous tree is widely planted. It is being grown for use as a street tree by grafting on standards about 6 ft. high.

'Ojochin' (Large Lantern). Flowers large semi-double pink. Young leaves greenish bronze. Strong, vigorous, upright.

'Paul Wohlert.' Flowers double deep pink, earliest of this kind. Like a dwarf 'Kwanzan,' low and spreading.

'Shirotae' (Snow White). Sometimes listed as Mt. Fuji. Flowers double pure white. Young leaves greenish bronze. Broad.

'Shogetsu' (Moon Hanging Low by a Pine Tree). Flowers double pale pink fading nearly white. Graceful.

'Tai Haku' (Great White Cherry).

Flowers large single white. Young leaves copper red. Apparently a tetraploid form of the wild *P. serrulata spontanea*.

'Taki-Nioi' (Fragrant Cascade). Flowers white, single or nearly so, fragrant, late. Young leaves reddish bronze.

'Tanko' (Pink Pearl). Flowers double pink. Young leaves greenish bronze. Although the name is Japanese, this was raised by the California nurseryman W. B. Clarke.

Yama or Sargent Cherry (*P. sargentii*). It is convenient to group this lovely species with the cultivars. As a forest tree, it can reach 60 ft. in its native Japan. It covers itself with





MORRIS ARBORETUM

9414 Meadowbrook Ave. • Phila. • PA 19118
Ch 7-5777

CHIMONANTHUS PRAECOX



"The precocious winter flower," translates the Latin name; "winter-sweet" it is called in the English vernacular. Together the names provide a terse introduction to *Chimonanthus praecox*, a shrub that blooms whenever winter's freezing temperatures seem to abate, and whose flowers' sweet fragrance has been praised in two hemispheres. Michael Haworth-Booth, in *The Flowering Shrub Garden*, London, 1938, says of wintersweet's scent: "No nose that has ever smelt it in unsullied youth can ever forget it, even in extreme old age."

The visitor to the Morris Arboretum will find wintersweet in three locations: the first planting in the Bark Collection by the Hillcrest Avenue entrance; the second on the northwestern side of the Administration Building; the third near Japanese Garden I.

With outer petals a pale yellow-green, the inner densely striped with purple, the waxy fragrant flower of wintersweet awakens on bare branches in late winter or early spring. In the Arboretum it blooms anywhere from the first week of January to early April, depending on the mildness of the winter. Unfortunately, a very early bloom will be damaged by subsequent frost.

The lance-shaped leaves of *chimonanthus* appear after flowering. Dark and shiny-green, they average 3 in. to 4 in. in length and are shed in the fall. The form of *chimonanthus* is open and amorphous, its height ranging from 6 ft. to 8 ft. Its multiple stems increase by suckering, and, unpruned, the branch spread usually equals its height.

The natural home of this exotic shrub is somewhere in central to western China, though cultivation in that country has been widespread for so many centuries that it is now difficult to ascertain a single point of origin.

Plant-explorer E. H. Wilson writes of his travels in Szechuan province, China:



"Two very common plants on the cliffs in the glens [near the town of Ichang] are *Eriobotrya japonica* (Loquat) and *Meratia praecox* [a previous name of *Chimonanthus praecox*] (Wintersweet). Both flower about Christmas. These are two out of many plants which formerly were erroneously supposed to be native of Japan."

Of the plant under cultivation, he says:

"To all the flowers grown in Chinese gardens some peculiar significance or aesthetic value is attached." Wintersweet, called La-mei hwa, "... owing to the beauty and perfume of its flowers, which are produced in winter when few plants are in blossom, is very highly prized and regarded as a flower of refinement."

La-mei hwa translates to "waxy plum flower": "waxy" describing its semi-transparent petals, "plum flower" for its resemblance to the revered *Prunus mume* (which is mistakenly typed "plum"; it is actually an apricot). La-mei hwa appears in cultivation during the Sung dynasty, that is, approximately the eleventh century of our era. As domestication of the chrysanthemum, peony, and orchid began in China some 1,000 years before Christ, La-mei hwa is a relative newcomer to the Chinese *hortus*.

Five varieties of *Chimonanthus praecox* are known in Chinese gardens. Their poetically descriptive names are enumerated by Dr. Hui-Lin Li in his book, *The Garden Flowers of China*. The variety known in the west as *grandiflora* was called by the Chinese, the "Pale-hearted La Mei." Its bloom is devoid of the characteristic purple center, thus its "pale heart." Other varieties include the "Urn-mouthed La Mei," whose flowers open but half-way; the "Lotus La Mei," with slightly

acute petals; the "Nine-flowered La Mei," with small, light-yellow blossoms; and, finally, the "Sandal La Mei," earliest of bloom. This last, with profuse, dark-yellow, intensely fragrant flowers, is most highly prized of all the Chinese varieties.

In temperate areas wintersweet blooms close to the time of Chinese New Year festivities. The fragrant flowers, strung on fine wire, ornamented the holiday coiffures of Chinese women. Even the wood of *chimonanthus* is aromatic, and in China and Japan, bundles of twigs and prunings are used to scent linens and clothes.

The seventeenth century botanist, Engelbert Kaempfer, was the first to describe *Chimonanthus praecox* to the western world. It was from Kaempfer's description that Linnaeus classified wintersweet as a species of *calycanthus*. While wintersweet was a native of China and *calycanthus* a native of North America, Linnaeus, working

Even the wood of *chimonanthus* is aromatic and, in China and Japan, bundles of twigs and prunings are used to scent linens and clothes.

only from a description, recognized the undoubted relationship of the two genera. Later, 1819 to be exact, wintersweet was assigned its own genus, *Chimonanthus*, while retaining its designation of *Calycanthaceae* family.

In 1766, Lord Coventry of Croome in Worcestershire, England, received the first specimen of *Chimonanthus praecox* to be introduced to western cultivation. Planted in his conservatory, it reportedly grew to a height of 16 ft. in 33 years, its fragrance wafting some 150 ft. from the building! His Lordship distributed many plants to surrounding nurserymen and, through propagation and the introduction of new specimens, wintersweet became a

popular plant in the English garden.

The period from 1750 to 1860 in America saw the importation of an ever-increasing number of exotic ornamental trees and shrubs from European gardens. Dr. Li notes in the *Morris Arboretum Bulletin* (Vol. X, No. 1) that *Chimonanthus praecox* was cultivated in the Wyck Garden in Germantown in the early nineteenth century. The gardens of Germantown were early known both for their profusion of flowering plants and for their keepers' talent and devotion. It's possible that the Wyck planting was among the first introductions to reach American soil.

For the present day Philadelphian interested in the cultivation of *chimonanthus*, one requirement overshadows all others. Wintersweet, in our area, must have winter protection. Most moderately rich garden soils with adequate drainage will foster its growth; shady and sunny locations seem equally amenable. But without winter shelter, provided either by a site next to a wall (ideally in a southern or western exposure), or by other plantings, wintersweet will not succeed in our area.

Layering in the spring or early summer is probably the best method of propagation in this locale. Wintersweet is easily grown from seed, but seed production in this, the northernmost part of its range, is erratic. The somewhat rangy habit of the shrub can be controlled by pruning after flowering is completed.

The Brooklyn Botanic Garden's Handbook, "1200 Trees and Shrubs—Where to Buy Them," 1970, advises that *chimonanthus* is available commercially from the George W. Park Seed Company, Greenwood, South Carolina 29646. This company has a mail-order catalog. Another source, somewhat closer to home, is the Rose Valley Nursery in Media, Pa.

●

 by Susan B. Blum



ORGANIC GARDENING IN PERSPECTIVE

The concept of organic gardening is not new. The appreciation of organic matter in maintaining the structure and fertility of soils is as old as agriculture. Through the years, however, there has emerged an almost mystical devotion to the idea that only a system of natural, organic, non-chemical farming would maintain a healthy agriculture. Foods grown organically are, therefore, defined as only those foods grown with the use of organic fertilizers such as animal manure, compost, bone meal, slaughterhouse tankage, blood meal, dried and ground sewage sludge, cottonseed meal and soybean meal for example. Organic gardening also prohibits the use of herbicides and pesticides.

Traditionally, the advocates of the organic gardening concept have been a rather small group of people who honestly thought that route was beneficial. Within the past 10 years, the idea has caught the interest of the younger generation, and the "organic food movement" is growing in strength and is supported by an increasing number of people. The newly found interest in the organic food movement can be attributed to several factors. The general public has become aware of the positive correlation between good nutrition and health. One of the claims very often made regarding organic foods is that they possess superior nutritional value and contain unidentified health-promoting factors. Another reason for the success of the organic food movement is the general concern for the environment. The organic advocates contend that if we universally use biodegradable refuse (leaves, weeds, straw, garbage,

paper), then environmental pollution will naturally disappear. Lastly, the interest in "organic" foods can be attributed to a revolt against the established food industry and the broad use of food additives. Many young people have found gardening the "organic way" a means of self-support with the added appeal of being closer to nature.

To place the organic gardening concept into some perspective with the present world situation, the relation-

Some of the tenets of organic gardening are basically sound, some are half-truths, and others are contrary to the best scientific evidence available.

ship between increasing population and decreasing natural resources must be considered. The population explosion has put additional pressure on the need for food supplies of greater quantity and higher quality. At the same time we are increasingly aware that the resources of "Spaceship-Earth" are finite and that unwise use of agricultural materials and inadequate disposal of agricultural and industrial wastes can seriously contaminate the environment. Into this complex global situation, the organic gardening concept is proposed as an answer to many of the problems. Some of the tenets of organic gardening are basically sound, some are half-truths, and others are contrary to the best scientific evidence available.

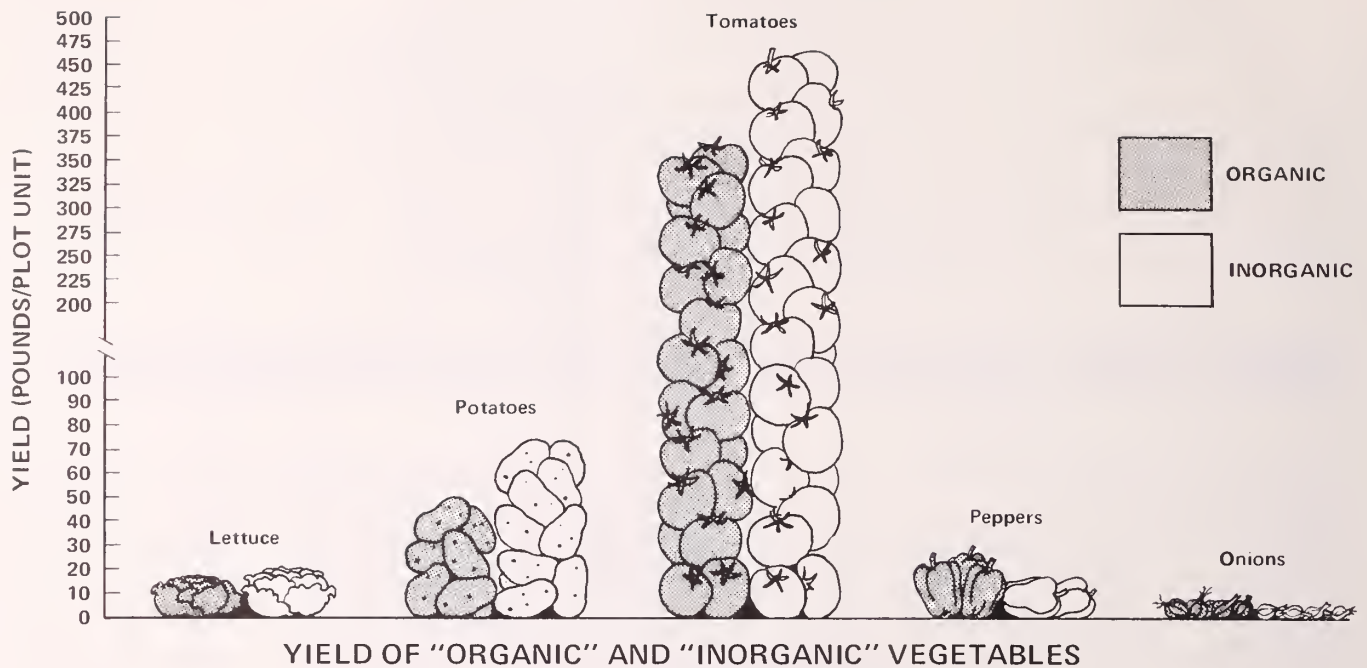
facts and fallacies

Agronomists agree that organic matter is indeed an indispensable ingredient

in moist soils. It increases water holding capacity, slows erosion, and through the decay process, releases nutrients to growing crops. The fallacy enters when it is stated or implied that the use of composted materials, without chemical fertilizers, is adequate to build up organic matter in soils and solve the problems of crop nutrition. Over the wide span of land under cultivation throughout the world, it is impossible to accumulate sufficient plant compost material to increase adequately the organic matter in the soil. Studies show, however, that both organic matter and crop yield can be significantly increased through the use of chemical fertilizers. The relationship between organic or inorganic fertilizers, and crop yield was demonstrated in a research project conducted at the University of Delaware. Garden vegetables were grown using both organic and inorganic fertilizers and the resulting crop yields are depicted in Figure 1. It is obvious from these results that yields are generally lower with organic fertilizers. Wheat and corn yields increased 100-fold when chemical fertilizers were used. If farmers reverted to the organic fertilization method, we would experience serious repercussions regarding total agricultural output: there would be insufficient food, and more than ever, there would be starving masses.

Low crop yield also has economic implications. Since the supply of organically grown food is limited and the demand for these food items is growing, the cost to the consumer is higher than conventionally grown food products. The question then becomes one of

continued



whether the "organic" product is better than the "inorganic" one. The term "better" may be used to describe the nutritional and palatable characteristics of foods, as well as the degree of contamination by toxic agricultural additives. Let's examine each of these factors.

A claim very often found in organic gardening literature is that "organic" foods are nutritionally superior to "inorganic" foods. The idea that a nutrient element supplied to a plant from inorganic fertilizer is different in nutritional value than the same nutrient element from organic fertilizer is contrary to scientific evidence. Before nutrients from organic materials can be used they must first be converted to the inorganic form (i.e., the nitrogen or phosphorous must be released) so that the plant can absorb them. In the University of Delaware study previously mentioned, selected vitamin and mineral analyses revealed generally no significant differences between nutrient contents of organically and inorganically grown garden vegetables.

In reading organic gardening literature it is not unusual to come across such a statement as, "You haven't tasted a carrot until you eat an 'organic' carrot." Measuring palatability characteristics as appearance, color, texture, and flavor is subjective and difficult. Food scientists, however, have developed food preference tests for a taste

panel. Palatability studies were conducted at the University of Delaware on organic and inorganic tomatoes and baked and boiled potatoes. The "organic" canned tomatoes were preferred primarily because of their less solid

The idea that a nutrient element supplied to a plant from inorganic fertilizer is different in nutritional value than the same nutrient element from organic fertilizer is contrary to scientific evidence.

consistency. The "inorganic" potatoes were preferred because they did not exhibit the color changes of the "organic" potatoes. The "organic" potatoes turned yellow when boiled and greenish-white when baked. Any taste advantages exhibited by organically grown foods are most likely attributable to their being fresh (from the garden to the pot). Of course, that is not the case for the conventionally grown foods, which move through several steps before finally reaching the consumer.

Finally, there is the question regarding the poisonous and deleterious nature of agricultural chemicals. Unquestionably, the careless use of pesticides and overzealous use of food additives can produce toxic effects in animals

and humans. But government agencies such as the Food and Drug Administration and others continually monitor food products shipped to market. Before an agricultural chemical can be approved for use, residue standards are set at very low, nontoxic levels. If food products to be marketed do not meet these standards, the regulatory agency prohibits their sale. The record of the regulatory agencies in protecting the consumer is quite good, especially when we consider the huge quantity and variety of foods under their surveillance.

In summary, man and domestic animals are voracious users and converters of organic material to energy. It makes sense to re-use as much of our waste products as possible. It is unlikely, however, that enough organic residues can be reclaimed and be delivered at the right time and place and in the proper condition to provide adequate food for the population at its present size. Chemical fertilizers can complement organic matter and should be viewed as a flexible economic device created by man to assist nature.

Carolyn Thoroughgood is an Associate Professor of Food and Nutrition and Marine Studies. At present, she is Associate Director of the Marine Advisory Services at the University of Delaware. Dr. Thoroughgood received her Ph.D. in Nutrition and Poultry Science from the University of Maryland.



Muriel Happich is a research chemist at the Eastern Regional Research Center, U.S. Department of Agriculture, Wyndmoor, Pa. Her special horticultural interests are lilies, wildflowers, primulas and narcissus. Ms. Happich is a director of the North American Lily Society, a vice-president of the Germantown Horticultural Society and a member of a number of other plant societies.

lilium canadense

A charming and graceful native lily, *Lilium canadense*, is my favorite of all lilies. Commonly called Canada or meadow lily, it is widely distributed over eastern North America. Its natural habitat is wet meadows, along streams and in moist woodlands in full or nearly full sun. The flowers vary from pure yellow to deep red, are bell-shaped, heavily spotted and hang gracefully from arching pedicels. The ends of the tepals are recurved. Leaves are arranged in whorls around the stem and the plant may grow to 5 ft. or more in height. The elegance and beauty of a well-grown specimen of a good form of *L. canadense* is difficult to surpass. The bulbs are stoloniferous with scales that resemble kernels of corn.

Lilium canadense was named by Linnaeus. The nomenclature offers difficulties for identification because of the extreme variation in the species. Dr. R. W. Lighty identifies varieties of the species in a monograph published in the *Quarterly Bulletin of The North American Lily Society*, September, 1965.

Lilium canadense is reported to be easy to grow. Some years ago we collected a pure yellow form in Vermont. It remained in our garden for quite a few years but did not perform well. More recently, we collected bulbs of a red, heavily spotted form from a relative's wild, wet meadow in northeastern Pennsylvania. The bulbs were about 3 - 4 in. beneath the soil surface, and the plants were growing among matted grasses and weeds and small native shrubs, which kept the soil cool. The plant stem with flowers extended into full sun. The soil was black, acid (pH about 5.5) and very wet. These plants bloomed about mid-June in Jenkintown and were a delight to the eyes. They remained in our garden, blooming regularly for several years. Good drainage for the bulb, a continuous supply of moisture to the roots, an acid, humusy soil and a deep mulch or companion plants to keep the soil cool are necessary to grow "*canadense*" well in our gardens. Our greatest difficulty has been to supply adequate moisture to the roots and to maintain an acid soil.

The best time to plant is in the fall. Rex Bulb Farms, Newberg, Oregon, lists bulbs and seeds of a yellow form, *L. canadense flavum*, in their Fall - 1974 catalog.

Muriel Happich

begonia 'robert shatzer'

Begonias have long been recognized by plant connoisseurs as one of the largest and most versatile of all plant families. Whether for accent in a summer garden or riotous bloom indoors in a dreary winter, there are few plants that rival the satisfaction gained from growing begonias. Begonia 'Robert Shatzer' is a dwarf form of *Begonia boweri* and has proven to be a most delightful addition to our collection. The specimen that we have is about four years old and is growing in a 3 in. sphagnum moss basket. Although it has not yet covered the basket (which gives you some idea how slow-growing this particular species is), its diminutive form makes it a joy the year-round. Even the largest of the leaves is only ¼ in. to ½ in. wide at its largest dimension. Flowers, ranging in color from white to pale pink, cover the plant from January to March and are remarkably long lasting.

Culture of Begonia 'Robert Shatzer' is much the same as it is with other rhizomatous begonias. A potting mixture of equal parts of garden soil (or sterilized top soil), humus, and sand or perlite is a good growing medium, and biweekly application of a general house plant fertilizer (either 15-30-15 or 20-20-20) is essential for good growth and vigorous flowering. Routine maintenance (such as removing dead leaves and flowers and checking for signs of disease or insect damage) is always a good idea with any house or greenhouse plant. Light seems to be a critical factor in the pro-

continued



Nancy Kolb studied botany and biology in college and traces her interest in plants back to that time. She has a small greenhouse at her home in Doylestown, and her specialty is begonias. She won the Edith Wilder Scott Award at the 1971 Flower & Garden Show. In 1974, she was runner-up for the Horticultural Sweepstakes and won both begonia awards.



Gustave E. Landt claims he is a born gardener. Twelve years ago his interest in fruits and vegetables extended to rhododendrons, dwarf conifers and Japanese gardens. He is chairman of the joint committee of the rhododendron garden at Tyler Arboretum, Philadelphia & Valley Forge Chapters.

duction of flowers, and although begonias are sensitive to intense direct sunlight (especially if the leaves are wet), they require good light (a southeast or east window seems better in the winter months).

Unusual varieties of begonias are not easy to find; however, you might try Logee's Greenhouses in Connecticut, Kartuz Greenhouses in Massachusetts or Merry Gardens in Maine for a starting point. If you are lucky enough to find a specimen or a small cutting, I am sure that you will find 'Robert Shatzer' a most enjoyable addition to your plant collection.

Nancy D. Kolb

Mrs. E. C. Stirling

Mrs. E. C. Stirling swept me off my feet when I first saw her. I am speaking, of course, of a rhododendron. She carried trusses of superior elegance, sumptuously clothed with delicate pink florets carrying just the touch of blue that provided the delicacy of color of the orchid.

Up to this time I had been familiar only with the rhododendrons that constituted the work horses of the eastern nursery trade.

My first encounter occurred in 1960 in Oregon. The introduction seemed doomed since the plant was rated H3, which means it is hardy only to -5° on the eastern seaboard. Nonsense. I had to have the plant and by cozening her perhaps she would endure. She did, and I have had a small collection of Mrs. E. C. Stirlings since.

You will find Mrs. E. C. Stirling in the rhododendron garden of the Tyler Arboretum. It lives there with a number of other beauties in the H3 range that have been brought from the West Coast and they have successfully accommodated themselves to our more rigorous climate.

Gustave E. Landt

classified ads

AFRICAN VIOLETS—America's finest, including amazing Rhapsodies, plus scores of other varieties. Send for color catalog, 15¢. Illustrated Growing Aids Catalog, 25¢. FISCHER GREENHOUSES, Dept PH, Linwood, NJ 08221.

Wanted: Customers for superior varieties such as: *Acer rubrum*, *Cercidophyllum japonicum*, *Cryptomeria japonica*, *Enkianthus campanulata*, *Hydrangea quercifolia*, *Ilex glabra compacta*, *Ilex 'Nellie Stevens'*, *Juniperus chinensis sargent*, *Pinus densiflora umbraculifera*, *Stewartia pseudo-camelia*, *Styrax obassia*. All, and more available from Rose Valley Nurseries, 684 S. New Middletown Rd., Media, PA 19063. Telephone Ben Palmer, TR 2-7206.

DAHLIA SEED — REDSKIN 1975. All American Bronze Medal Winner. Flowers 3 in.; colors: white, yellow, pink, orange and red. Grows 15 in. high with bronzy foliage. Price \$1.00 per packet. Stanley Johnson, Cheltenham, PA 19012.

WANTED: Gardener housekeeper couple for small estate in Bedford, New York. Gardener's cottage and small greenhouse. Send resume and references to Box 10021, c/o Green Scene.

EARN MONEY by selling herbs at your spring fair. We will supply healthy herb plants in labeled peat pots. Send self-addressed, stamped envelope for price list. Ryder's Herb Farm, 30 McClelland Avenue, Pitman, NJ 08071.

MAIN LINE GREENHOUSE SERVICE. Complete and professional care by week, month or year. Includes individual plants for travelers. Barnes Foundation graduate. Member of Pa. Horticultural Society, Orchid Societies and Begonia Society. Reasonable. LA 5-8098.

Specialists in Japanese, City, Naturalistic gardens, featuring volcanic rock, ornamental pools, waterfalls, terraces. Plantings designed by Landscape Architectural Service Department, installed by expert landscapemen. J. Franklin Styer Nurseries, Inc., Concordville, PA 19331. Telephone GL 9-2400.

Greater Philadelphia Orchid Society, Inc. Annual Spring Auction. Exotic and easy to grow orchid plants. Thursday, 8:30 p.m., April 17, 1975, Merion Friends Meeting House, 615 Montgomery Avenue, Narberth, PA (next to Gen. Wayne Inn).

LORD AND BURNHAM GREENHOUSES for the care, cultivation and protection of tender growing plants; painstakingly custom designed to your specific horticultural needs, flawlessly erected, and delivered on time every time. Inquiry welcome. OED, INC., Villanova, PA. 688-4825.

Hundreds of satisfied green tenants... From the plant people who build greenhouses... Not builders who are green about plants.

FERN HILL FARM DR. MARTIN POLE LIMA BEAN SEED. Certified True to Type and Germination Tested by New Jersey Department of Agriculture. Hand selected seed available from Fern Hill Farm, Jessup Mill Road, Clarksboro, NJ 08020, at \$1.00/pkt. (12 seeds) + 50¢ postage per order.

Advertising copy should be submitted 8 weeks before issue date: November, January, March, May, July, September. Minimum rate \$5.50 (covers up to 35 words) Additional words 20¢ each. Less 10% discount for two or more consecutive issues, using same copy. All copy should be accompanied by check made out to PENNSYLVANIA HORTICULTURAL SOCIETY and sent to Patricia M. Cain, THE GREEN SCENE, 325 Walnut Street, Philadelphia, PA 19106.

digging for information



HORTICULTURAL CORRESPONDENCE

by Ed Lindemann
horticulturist

what to do with easter plants

Potted Bulbs: Each year thousands of people receive potted tulips, daffodils and hyacinths that have been forced. These gifts are enjoyed for a brief period of time in the house and are then usually discarded. If you have room in your garden it is worth planting the bulbs outside. After the blooms fade, reduce watering and wait for the foliage to yellow and wither. Remove the bulbs from their container and plant them outside immediately. Many bulbs will produce blooms the following spring while others may take two growing seasons to regain their strength. It is worth the effort of planting these bulbs outside, but don't try to force them a second time. The results will be disappointing.

Azaleas: Most of the azaleas sold as Easter plants are not hardy in our area. These plants can be kept successfully from year to year on a cool sunporch or in a greenhouse. If you cannot supply a cool, moist environment do not try to keep a non-hardy azalea.

Once the flowers have faded, prune the plant back severely. After the weather has become mild, plunge the plant in its pot in a semi-shady location out-of-doors. Water often and wet the foliage to discourage red spider mites. About September 1, bring the plant inside. Water just enough to keep the soil from drying completely. In January increase watering and provide as much light as possible. Fertilize with a water-soluble fertilizer from February to October. If the growing conditions are right the plants will give a beautiful display of color in early spring.

dividing perennials

Perennial plants should be divided when they are dormant. Dividing is

best done early in the spring when the ground is soft enough to work, and the plants have yet to start growing. Most perennials are in need of dividing if they have grown undisturbed for three years.

Perennials may grow in a dense mat form such as chrysanthemums or increase in size by way of runners (strawberries) or rhizomes (iris). After the plants have been dug, divide the parent plant into several pieces. A sharp knife or spade is the easiest tool to work with. After the plants have been taken apart, replant only the strongest new growth. Old divisions or diseased parts of the plant should be discarded. Do not replant the new divisions too close together. Remember, you don't want to have to redivide again next year.

Chrysanthemums are the one perennial that I divide every year. Many people do not realize it, but each small rooted piece of the parent chrysanthemum plant if properly cared for will grow into a mature flowering plant by fall.

gold dust tree

Q. I understand that the enclosed leaf is referred to as the gold spot croton. Is that correct?

The plant was growing very nicely in Broomall during the summer. At the beginning of August, I put some in water under fluorescent lights and the roots are about 5-6 in. long now. Will the plant survive indoors and out?

V.B., Philadelphia, Pa.

A. The plant you are trying to identify is *Aucuba japonica variegata*, com-

monly called gold dust tree. It is semi-hardy in the Philadelphia area. It is also grown as a "cool greenhouse" plant. Aucuba prefers half shade and moisture. If grown inside during the winter, the plants should go out-of-doors in summer.

hair spray

Q. Recently I was told that some flowers can be preserved for a long period of time if they are sprayed with hair spray. I was also told that the hair spray had to be a particular kind or it would not work. Do you know which brand should be used?

C.D.R., Philadelphia, Pa.

A. Your information is only partially correct. Hair spray can be used after the flowers have been dried. It should be a spray that contains no water. Clear plastic sprays may also be used.

hibiscus

Q. I have several hardy hibiscus that should be transplanted. They have been in their present location for five years. Can these plants be successfully moved? If they can, when is the best time to move them? Any help you can provide will be appreciated.

R.M.C., Haddon Heights, N.J.

A. Hibiscus should be moved only in the spring. The soil over their roots should be mulched for the two winters that follow.

Try to move as much soil with the root ball as possible and prune the top growth back approximately 1/3 after transplanting. The addition of organic matter to the soil and regular watering will help the plants to establish themselves.



A walkway on the grounds
of Friends Hospital



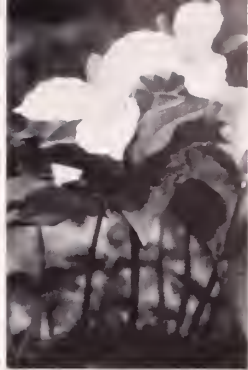
A South Jersey Garden

THE
**green
scene**

HORTICULTURE IN THE DELAWARE VALLEY

MAY • JUNE • 1975

\$1.00



24



6



13



2



20



16



THE green scene

HORTICULTURE IN THE DELAWARE VALLEY

Volume 3, Number 5 May, June, 1975

published by
THE PENNSYLVANIA
HORTICULTURAL SOCIETY
325 Walnut Street, Philadelphia, Pa. 19106

Ernesta D. Ballard/*President*
Jean Byrne/*Editor*

PUBLICATIONS COMMITTEE

Craig S. Oliver/*Chairman*
George M. Harding
Nancy Howard
Robert S. Ryan
J. Franklin Styer
Dorothy Young

Patricia M. Cain/*Classified Advertising*
/Retail Distribution

Designer

Julie Baxendell
Baxendell Design Associates

THE GREEN SCENE, Volume 3, No. 5, published bimonthly, January, March, May, July, September, November, by the Pennsylvania Horticultural Society, a non-profit membership organization at 325 Walnut Street, Philadelphia, Pa. 19106. Subscription: \$5.00 — Single Copy: \$1.00. Second class postage paid at Philadelphia, Pa. 19104.

POSTMASTER: Send Form No. 3579 to THE GREEN SCENE, 325 Walnut Street, Philadelphia, Pa. 19106.

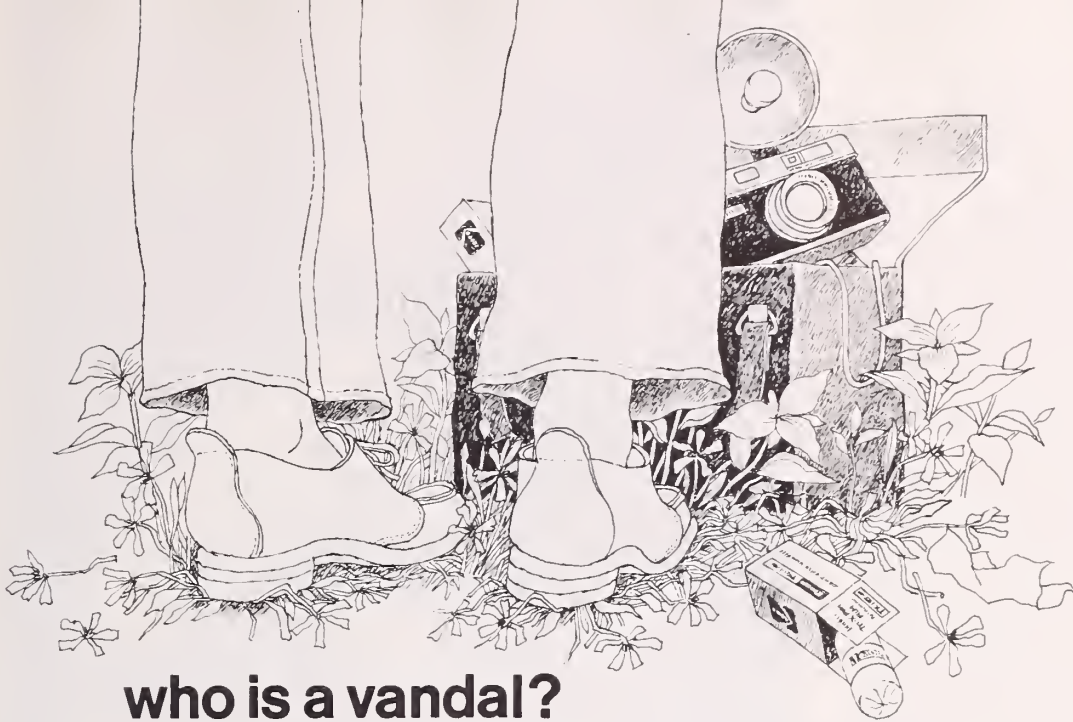
© Pennsylvania Horticultural Society, 1975

in this issue

- 1 Editorial by *Bebe Miles*
- 2 A South Jersey Garden by *Barbara Bruno*
- 6 Tomatoes, the Fruit of the Year
- 13 The Elevated Container Garden by *Doris Joiner*
- 16 Lettuce, Year-round by *M. M. Brubaker*
Lettuce (et al.) in Containers by *Charlotte Archer*
Lettuce Under Lights by *George Elbert*
- 20 Naturalizing Daffodils, an Investment in Gold
by *Kitty Lapp*
- 24 Welcome to Bowman's Hill by *Bebe Miles*
- 27 Books and the Green World: Roses in Depth
by *Léonie Bell*
- 28 The Tyler Arboretum: Flowering Dogwoods and
Some of Their Kin by *Gertrude S. Wister*
- 32 The Morris Arboretum: Lilacs by the Tree-Full
by *Susan B. Blum*
- 33 Classified Advertising

Front Cover: Studio and grape arbor in Barbara Bruno's garden.
Rose 'Kathleen' against weathered wood; nigella,
Alchemilla mollis and pineapple mint in foreground.
See story on page 2.

Front cover by *Léonie Bell*
Back cover by *Bebe Miles*



who is a vandal?

Talk to anyone connected with a park or botanical garden, and before long the subject will get around to vandalism. For some sad reason the very places that have been set aside as oases of green and growing things take the worst beating from the public.

Dr. Edgar T. Wherry, one of the founders of Bowman's Hill State Wildflower Preserve, has been fond of saying we have two kinds of visitors: those who steal plants and those who take away the labels. Volunteers who serve at various times make the acquaintance of several other types of vandals.

There is the young lover who picks a trillium for his sweetheart and thereby kills the trillium plant since vital leaves go with the flower that grows inches away from its only foliage. There is the speed demon who exceeds the 10-MPH limit in the park, fails to make a curve and destroys trees and bushes plus 50 feet of cedar fencing. And the spoiled brats who chop up signs and bulletin boards for the sheer joy of destruction.

Even more reprehensible is the botanist or ardent gardener who "takes just a tiny slip," but fails to think that if everyone did likewise the largest tree in the Preserve would be leafless. There were more than 100,000 visitors to Bowman's Hill last year, and the wonder is that there is anything left after the ballplayers, drag racers, blanket sitters and collectors get finished with those carefully-nursed trails.

But who do you think the staff votes the worst vandal of them all? The amateur photographer wins hands down. He comes from all over with his tripod and his supply bag and his big feet; the more beautiful or rare the flower, the more damage he does in the rush to take its picture.

If another plant is in the way of his subject, he uproots it with all the arrogance of Attila faced with a band of children. If the subject is not directly by the trail, he leaves the walkway with the unconcern of a bulldozer clearing for a new freeway. He disposes of unphotogenic leaves or seedpods as if a closeup lens makes him above the law.

These pirates have grown so bold in their rapine that it is actually necessary to post guards by special plants at certain seasons. A sad way to have to spend a lovely spring day. It is probable that only a strenuous policy of arrests and fines can make even a dent in the damage the shutterbugs do.

I make no case for the others, but the photographer has become one of the worst offenders of all those who deface the parks. The irony is that each thinks he is contributing to the beauty of the world. No way, brother, no way.



by Bebe Miles

See page 24 for Bebe Miles' story about Bowman's Hill.



Clary sage (*Salvia sclarea*)

photos by Léonie Bell



At left:

Left to right foreground euphorbia and artemisia; background digitalis and larkspur.



by Barbara Bruno

Barbara Bruno is a self-taught gardener. She collects rare herbs and roses. Ms. Bruno runs an antique shop and sells herb plants at her home in Bridgeton. She studied art at the Philadelphia Museum School of Art.

A South Jersey Garden

While I understand the necessity of the low maintenance, outdoor room-type of garden popular today, my ideal and inspiration has always been the sunny, plant-filled patchwork of the English cottage garden. And sweet smelling herbs have always intrigued me. These two interests joined in the dream of a garden of soft, silvery plants humming with bees. The dream colored my hopes as I set about to make a garden on the worn-out soil of an old South Jersey farm 10 years ago. Fortunately, the preponderance of herbs and the poor, sandy soil I had to work with have been a good match.

I had always envisioned an old house surrounded by mature clumps of trees and shrubs as a base on which to begin my own garden. While the old house is here, whatever plantings might have existed were bulldozed along with some old outbuildings when they cleaned up the place to sell it. Several old maples, however, were left framing the house. The roots of a lilac

hedge scraped away in the cleanup delighted me by renewing growth my first spring there, and a few daffodils of an old, double variety were saved in an out-of-the-way corner. The land that had not been swept clean of topsoil by the bulldozer was covered in a dense growth of honeysuckle and wild blackberry whips. Like many buyers of newly built homes, I was faced with a flat, featureless landscape.

Although I am by nature a collector of plants, loving the search for the rare and unusual, my training as an artist dictates planting for effect. However, the garden took shape slowly over a period of many years. I felt it best to add a feature and observe it through a growing season before making further changes. As the plan developed, one of the most important considerations was how to divide the garden space to give a feeling that there were surprises yet to come.

we tried several approaches:

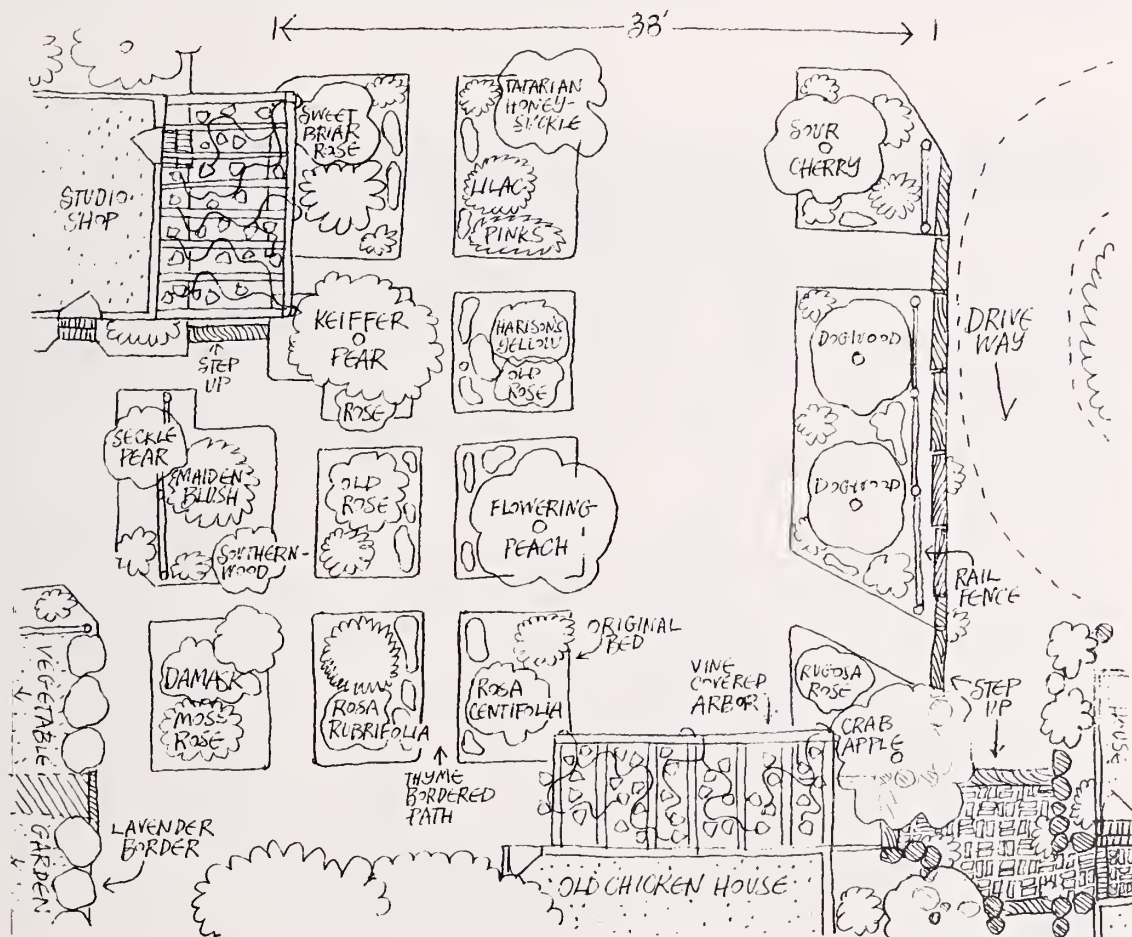
Careful placement of shrubs and

fences to limit vision so that all the garden is not viewed at once, addition of architectural detail to add vertical interest, and the use of a minimal slope to create a change in level.

The garden started as one rectangular bed 7 ft. x 10 ft. containing mostly culinary herbs and a few silvery plants. As my collection grew each year more rectangular beds were added. The series of beds, intersected by grass paths, now forms the nucleus of a garden that has expanded in all directions.

The beds are a gay disorder of flowers, herbs and shrubs such as I like to think might have been found in gardens of earlier times. While I work for a certain amount of color harmony, I rather like a patchwork, crazy quilt effect of many textures and colors. Although the planting isn't exclusively confined to flowers of any special period, I prefer plants that have an old-fashioned feeling about them. A balance between leaf size and bloom,

continued



Barbara Bruno's plan for her garden in South Jersey.



Dianthus x Allwoodi grown from seed.

rather than outsized flowers is favored, as are varieties with silver foliage and variegated leaves. Typically, I collect early forms of iris that look well in their pale honeys, orchids and lavers with the garden's herbal colorings. Old roses make flowering fountains for the centers of many beds.

arbors and terrace

A few years ago an unused building was moved from another part of the property to serve as a shop for the dried flower-herb business. It was placed at the far corner of the garden to create a focal point and help to visually divide the cultivated garden from the open fields beyond. Several short stretches of rail fence further break up and define the garden area and also serve as supports for a growing collection of old, climbing roses. Two arbors were constructed to add more architectural interest to the garden. Both were built of cedar poles, which have weathered to a mellow gray making a fine background for the climbing plants which they support.



Sedum dasyphyllum

One arbor is attached to the studio and spans a wide grassy approach to the door. Several old, common varieties of grapes make this a pleasantly shady, summer retreat. At the sunny east end, the arbor supports a cherokee rose, *Rosa laevigata*. Brought back as a cutting from a trip south, it has proved to be surprisingly hardy, holding its shiny, disease resistant leaves almost all winter long. Here, it is one of the first roses to bloom, covering itself in large, single-cupped white blooms centered with a showy ring of golden stamens. Although having only one season of bloom the show continues into fall when the large, oval, bristle-covered hips attract much attention. Its fierce prickles can be a drawback if the canes are not promptly tied up.

Another arbor covers a path leading to the vegetable garden and helps to camouflage an aging chicken house used to dry herbs and flowers. Newer grape varieties shade the path below. 'Sombreuil,' a favorite, old climbing tea rose twists along the west side offering its creamy white, heavenly-scented bloom all summer long. A *Clematis paniculata* makes its bowered arch at the end of the arbor seen from the house. In late summer the vine is a sweetly scented, white froth of bloom.

A small, dry-laid brick, dooryard terrace was one of the first major additions. This sunny, quick drying spot proved to be an ideal location for herbs that dislike the damp mugginess of the summer border. Woolly thyme thrives here, making lace doilies of fuzzy gray along the terrace edges. A rosemary plant, not hardy in the open garden, hugs the side of the brick steps in perfect health. The terrific summer heat and the protection of a brick blanket above its roots in winter are very much to its liking. Here in this sunpocket my earliest crocuses bloom and sweet alyssum scents the air long after the first frost.

A collection of sempervivum once thrived at the base of the back steps between wide-spaced bricks. The tender greens, purples and cobwebbed-silvers disappeared, alas, with the addition to the household of two, heavy-footed dogs. *Sedum dasyphyllum*, growing in out-of-the-way chinks on the terrace, still delights me

all year round with its tiny, tight clumps of silver-green beads.

A few trees have been used to add height and provide a bit of shelter for shade-loving plants in this sunny garden. Care has been taken to select small growing varieties that offer several seasons of interest. Two young crab apples raised from seed will one day shade the dooryard terrace. Their apple blossom pink bloom and purple toned leaves contrast pleasantly with the pinky-salmon brick of our old house. Another fast growing crab apple is now seven years from seed, 15 ft. tall and a breathtaking, splendid jewel of a tree in the autumn. Then its branches are almost hidden by the small, bright yellow apples it holds throughout the winter.

To me gardening is an active mental process as well as a physical undertaking.

I've capitalized on small slopes in several locations to change the levels. These changes, though only a railroad tie step-up, add interest to the planting and offer a perfect spot in which to grow those lovely plants that look their best when billowing and sprawling over an edge. In one such sunny, dry spot a plant of the old-fashioned laced pink drapes its lovely, silver mat. In another, a dark green, pungent thyme softens the line of the tie next to a billowy catmint, *Nepeta mussini*, spilling over the edge.

Another change of level is found along the south foundation of the house. Here a raised bed is edged in the rusty brown sandstone native to this area. The rocks harmonize well with the soil color and form an interesting contrast to the frosted lavender, silver variegated thyme and fragrant white dianthus that border this hot, sunny, difficult space. In May a lovely picture can be seen here as brilliant orange oriental poppies rise from a lavender veil of catmint backed by tall plants of gray-green catnip, *Nepeta cataria*. The edging of frothy, silver plants and the warm, salmon tone of the brick wall are a perfect foil.

vegetable garden

One of my first concerns was to

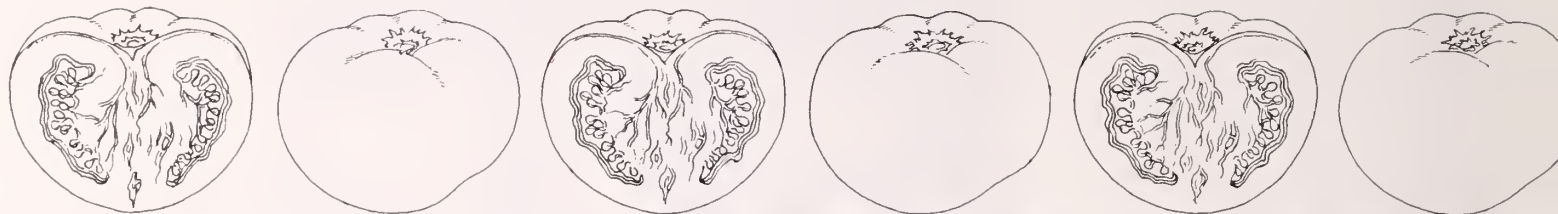
establish a vegetable garden. I grow a great variety of vegetables every year to freeze and to preserve as well as to use fresh throughout the summer. The largest portion of the vegetable garden is plowed and cultivated with a tractor. A second section nearest the house is divided from the mechanically farmed area by a hedge of raspberries. On the garden side, this section is bordered with a low hedge of lavender edged with a collection of creeping thymes. Several wood chip carpeted paths form beds, which are kept in a permanent mulch of leaves and grass clippings. Here, among more vegetables are plants grown for the dried flower business. Nursery beds for unnamed roses found in my search for old, lost varieties are also located here. These roses, found in cemeteries and old gardens are grown from cuttings, later to be transplanted into the ornamental garden.

Many unusual herbs new to me start their life among the vegetables before I move them to the harsher conditions of the herb garden. Some plants, unable to survive in the dry garden beds, remain permanently here. Many new plants grown from seed for the first time are housed here. Last year the wonder of the garden was an imposing thistle, *Onopordon arabicum*, which reigned over the vegetables at the far end of a path. Although the blooms were disappointing, the huge, silver-white, felted leaves tipped in wicked points were breathtakingly beautiful. This year new seedlings will be transferred to the herb garden to display their magnificence there. In the future I plan never to be without this dramatic marvel of plant architecture again!

While in the past, the garden had been constantly expanding, I look to the future as a time to consolidate and perfect what I already have. To me gardening is an active mental process as well as a physical undertaking. Sometimes the enormous task of coordinating growth patterns, textures, times and colors of blooms and most important, if there is to be any success at all, cultural needs, seems overwhelming. Luckily we are such that even a modest achievement spurs us on. And there is always another year, another chance to try again!

tomatoes ...

THE FRUIT OF THE YEAR



It is plain to see why the tomato has become the star of the plant world.

No fruit-producing plant has greater willingness to grow. No gardening experience is needed. When the time comes to set out plants you'll find young transplants ready to flower, at garden stores. Buy a half-dozen, plant them in containers or in the ground. With the most casual treatment they will continue to grow and produce fruit.

But for total involvement with a plant of many personalities become—not a gardener—but a Tomato Specialist. No plant is as responsive to special attention and manipulation.

Each variety—of a hundred or more available—has its special place in the tomato world. The Specialist will find ways to fit the right variety to his climate.

You don't have to have a garden to grow tomatoes. Tomatoes will do well as container plants. Dwarf varieties can be grown in 8-inch pots. Giant-sized plants will thrive in containers holding only two gallons of soil if you compensate for the limited root space by frequent watering and fertilizing.

Few plants are as adaptable to training as the tomato. Several varieties can be grown in hanging baskets. Others can be trained as an informal espalier on a trellis. They have been grown in plastic bags, planter boxes, baskets, plastic pails, wire cylinders lined with plastic. They have also been trained on stakes and trained themselves in wire cages.

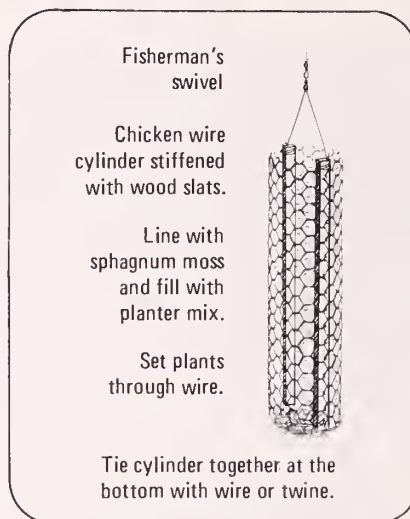
Gardeners in areas where native soils are unfavorable to tomato production find that container growing with disease-free planter mix is worth the extra care in watering and feeding.

the nature of the tomato plant

The more you know about the growth habits of the tomato the easier



A two-crop planting in planter boxes on deck. An early yield of strawberries followed by tomatoes.



it is to cope with its sometimes peculiar behavior.

The tomato is rather particular about air temperatures—especially night temperatures. In early spring when day temperatures are pleasantly warm but night temperatures fall below 55°, many tomato varieties will not set fruit.

For a deeply involved tomato grower this is the period of great anxiety. The blossoms are out. The big question: "Will they drop or set

fruit?" He must wait about 50 hours to find out. It takes that long or longer for the pollen to germinate and the tube to grow down the pistil to the ovary (see illustration on next page). At night temperatures below 55° the germination and tube growth is so slow the blossoms drop off before they are fertilized. Most of the early maturing varieties set fruit at lower temperatures than the main season varieties.

In the hot summer months you can expect blossom drop when day temperatures are above 90° or night temperatures above 75°.

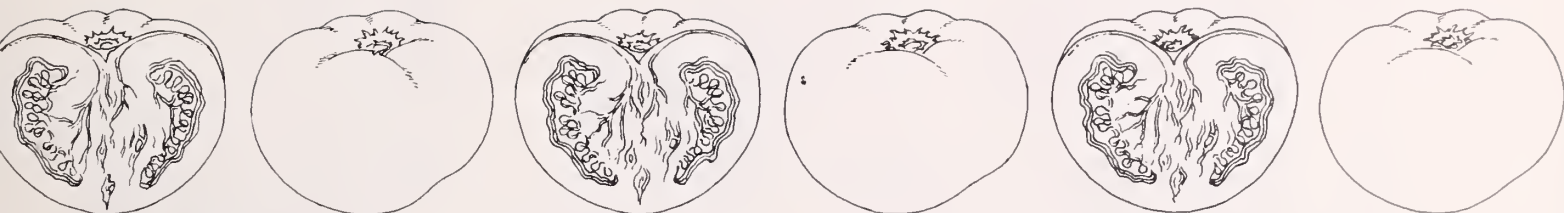
color and temperatures

In hot summer areas, high temperatures not only prevent fruit set but prevent the normal development of fruit color. The red pigment does not form when temperatures are above 86°. Uneven coloring of tomato fruits is common if the fruits mature when the temperatures are high.

High temperatures and high light intensities will stop the red color from forming in fruit exposed to the direct sun and the fruits may sun-scald. Where high summer temperatures are the rule, choose varieties with a good dense foliage cover.

This material adapted and reprinted, with permission, from the *Ortho Lawn & Garden Book*, published by Chevron Chemical Company. The *Ortho Lawn & Garden Book* is available from PHS and garden centers.

Chevron Chemical Company has other interesting publications that have been well received, e.g., *All About Vegetables* by Walt Doty (\$2.95).



failure to set fruit

Rain or prolonged humid conditions hamper fruit set. Growers in cool, humid situations have found that fruit set can be increased by shaking the plant, or vibrating it with a battery-powered electric tooth brush. When plants are trained on stakes, hitting the top of the stakes will increase pollination by releasing pollen. Best time to shake the plants is in midday when it's warm and the humidity is low.

all vine and no fruit

The tomato plant sometimes fails to change gears from the leaf-producing stage to the fruiting stage of growth. Given a strong push in the early stages with too much nitrogen and all the water it can use, it may go right on producing foliage at the expense of fruit. You can help the plant switch over to the fruiting stage by pinching out some of the terminal shoots, or by withholding water to check growth, or even by root pruning.

when leaves curl

Another worrisome period in your life with a tomato is the appearance of curled leaves or some form of wilt.

Wilt, during a hot spell, at midday is normal. Plants in containers show the need for water by their wilting and drooping of top growth. Their speed of recovery, when watered, is astonishing.

Some kinds of leaf curl are normal. It's more pronounced in some varieties than others. Expect curl during hot, dry spells and during and after a long wet period. Heavy pruning seems to encourage leaf curl.

news about tomatoes

The big news in tomatoes is not in the development of appearance of the fruit but in the newly built-in resistance to soil borne diseases and the development of varieties to fit the various soil and climate conditions throughout the United States and Canada. Varieties developed for California and the Southwest will not suc-

ceed in other regions. Southern varieties fail in the North. Eastern varieties have trouble in California. See the end of this article for variety recommendations.

The small 'Red Cherry' and the Yellow Pear are novelties in the eyes of tomato growers who work with the large hybrid or standard "noble" varieties. But their ability to survive and produce fruit under the most adverse conditions is much appreciated by the home gardener. They seem to grow through diseases that cut short the life of larger varieties and to set fruit when other varieties fail. Actually, they are not disease resistant or immune to blossom drop. The reason they succeed where others fail is the light load per fruit the plant must support.

The ratio of the volume of leaves (the fruit manufacturing plant) to the individual fruits is most favorable.

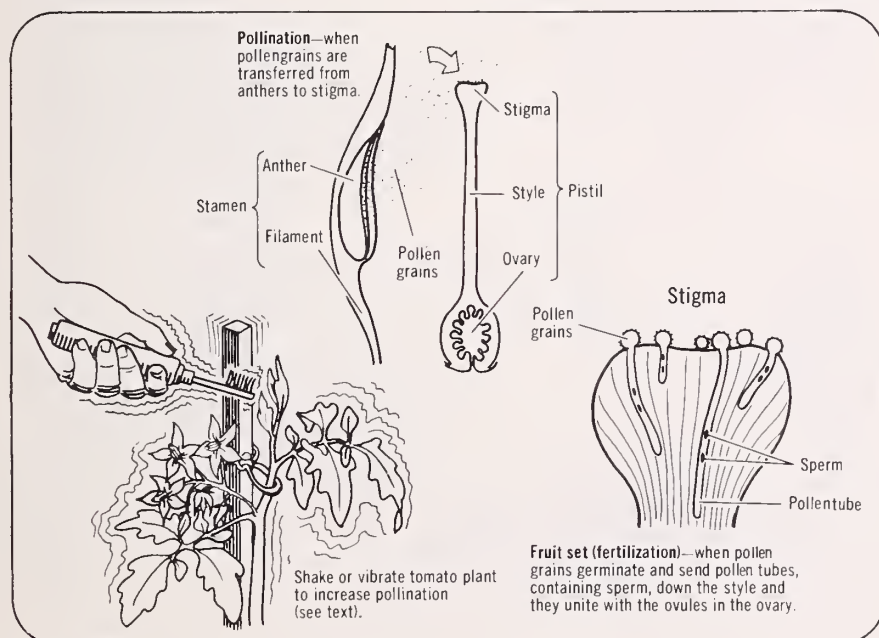
Flavor of a tomato is largely dependent on the ratio of sugar to acid. If the ratio is too low the tomato will be sour and have an insipid flavor. Generally the greater the percentage of jelly and seeds as compared to the flesh, the lower the sugar/acid ratio. The best flavored tomatoes are those that are allowed to ripen on the vine. However, a lot of damage can occur to fruit in rainy weather as it approaches the fully ripe stage. You'll get more tomatoes without cracks, rot or pest damage if you harvest at the pink stage and allow the fruit to ripen indoors.

tomatoes from seed

Success in growing good tomatoes from seed depends on how well these basic requirements are met:

1. Disease-free "soil."
2. Warmth and moisture for seed germination.
3. Adequate light for stocky growth.
4. An adjustment period to ready

continued



LYCOPERSICON ESCULENTUM



Indeterminate tomato. The terminal bud does not set fruit. The vine can grow indefinitely if not killed by frost. Most of the varieties trained on stakes or in wire cages are in this group.

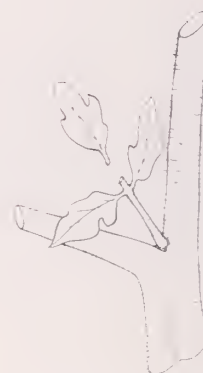


Determinate tomato. (Commonly called Bush tomato.) Terminal bud sets fruit, stops stem growth. The plant is self-topping. Seldom needs staking.



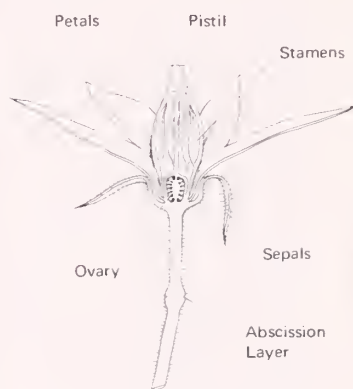
Abscission Layer
(the trouble bump)

The trouble bump. When you talk about blossom drop or failure to set fruit this is where it happens. Temperatures too low or too high, too much or too little water may be the cause.



When growing tomatoes on stakes, the side shoots or suckers sprouting in the leaf axils of the stem are broken off. If pinched out above the first leaf, the plant will have better foliage cover.

8

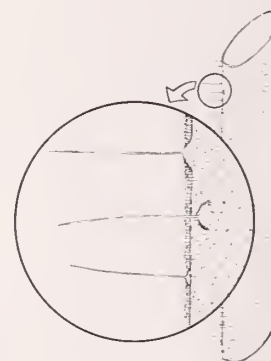


Blossom has 5 or more stamens (they produce the pollen) which form a cone around the pistil (the female organ). The blossoms are complete flowers and mostly self-fertilizing.

Determinate plant has less than three leaves between the flowering cluster. When tomato is grown from seed in place, a strong tap root develops. Transplants develop strong spreading root systems.



The fruit has 2 or more chambers. Large fruited varieties have 5 to 10. Gelatin-like substance surrounds the seeds and fills the seed cavity. Jelly content should be small in comparison to the amount of flesh.



Glandular hairs are found on stems and leaves. When broken, they give off the oil that has the characteristic tomato odor. Roots form all along stem when it's in contact with soil.

tomatoes...

the indoor plant to outdoor conditions.

You can meet these requirements in many ways. Sow seeds indoors starting five to seven weeks before time to set out plants.

Sow ½ inch deep in trays or in peat pots. Or use one of the blocks or cubes designed to serve as a seed starter and a block to grow in.

"soil" for seeds

These materials are free from disease causing organisms and are available at garden supply centers.

Vermiculite. A light weight expanded mica. The use of vermiculite as the "soil" for seeds avoids the death of seedlings from "damping off" caused by disease organisms in the soil.

Another advantage in starting seeds in vermiculite is the ease of lifting out the seedlings without damage to roots.

Synthetic soil mix. Jiffy Mix, Pro-Mix, Redi-Earth, etc. Seeds are sown

in it, and seedlings grown in it.

Jiffy-7 Pellets. A compressed peat pellet containing fertilizer. When placed in water it expands to make a 1¾ by 2-inch container. Seed is placed directly in container after expanding.

Fiber pots, trays, strips. Containers made of peat or other fibrous material. Fill with synthetic soil mix for growing on seedlings. No root disturbance, as container with plant is set out in garden soil.

Plastic. Pots or trays in various sizes and shapes. *Must* have drain holes in the bottom. Filled with synthetic soil mix for growing seedlings. Root ball tipped out when transplanting.

warmth and moisture

Whether in trays, cubes or whatever, the material should be thoroughly moist before seeds are sown. Give them the warmest spot you can find.

For fast germination seeds of tomato need a soil temperature of 75° to 85°.

Blocks or peat pots or trays should be covered with paper or slipped into a plastic bag to prevent drying out.

There should be no need for watering until the seeds have sprouted.

Once the seedlings emerge, keep them in full sunlight—12 hours a day if possible. The temperatures for seedling growth should be between 70° and 75° during the day and 60° to 65° during the night.

"hardening" transplants

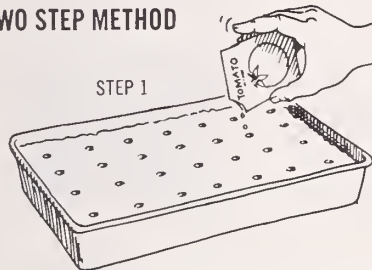
Young tomato plants should not go directly from an indoor environment to the open garden. Take them outside in the daytime and bring them in again at night if frost is likely. In one way or another expose them to lower temperatures about two weeks before setting out. Also, gradually expose them to more sunlight.

continued

Starting tomato plants

TWO STEP METHOD

STEP 1



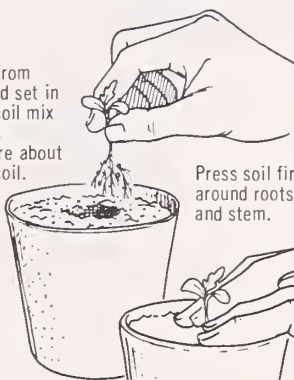
Sow seeds in a small tray of vermiculite. Be sure vermiculite is thoroughly damp before seeding. Set seeds about ¼ inch deep and about 2 inches apart. Cover seeds and water lightly. Slip tray into plastic bag and keep at about 75°. No water is necessary until after germination and then only enough to keep vermiculite damp, not soaked.

STEP 2

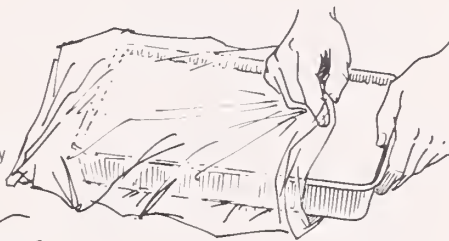
When the first true leaf is formed (it looks like a tomato leaf) the seedlings are ready to go into 3" to 4" peat or plastic pots filled with soil mix (see text).

Pull seedling from vermiculite and set in small hole in soil mix so seed leaves (cotyledons) are about ½ inch from soil.

Press soil firmly around roots and stem.

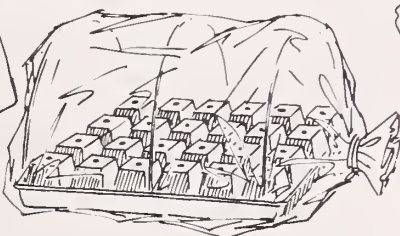
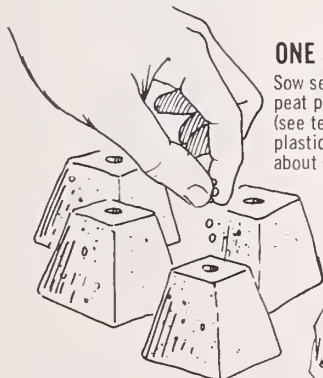


Put pots on a tray and in a plastic bag until ready for hardening off (see text). Wickets of coat hanger wire will keep plastic above plants.



ONE STEP METHOD

Sow seeds, 2 at a time, directly into plastic pots, peat pots, Kys-cubes, BR8 blocks, Jiffy-7 pellets (see text). Water thoroughly and place on a tray in a plastic bag. They'll be ready to transplant when about 6 inches high.



tomatoes...

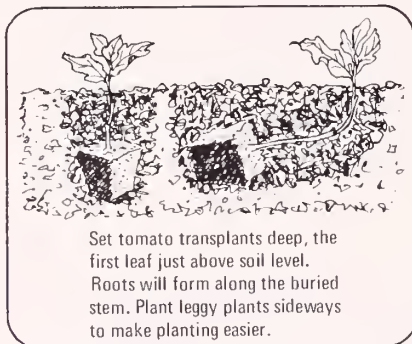
setting out

Plants should go into the soil with as little root disturbance as possible. There will be very little with peat pots, cubes and blocks but be sure that all such containers are below soil level to prevent rapid drying out of the root ball.

It helps to pack soil down around the root ball. It also helps to "spot" water the root ball in addition to regular irrigation.

Plants in plastic or clay pots will tip out easier if the soil is wet.

Don't set a plant growing in a light soil mix in a small hole in heavy soil. Blend organic matter in a larger planting hole so that there is no abrupt change in soil texture.



when you buy transplants

Whether you buy plants or grow your own, the plants that will take off and perform as a tomato plant should have these qualities:

They should be stocky—not leggy. Plant should have four to six true leaves, young and succulent. Avoid transplants in bloom or with fruit if growing in a peat pot size container.

tomatoes...their care and feeding

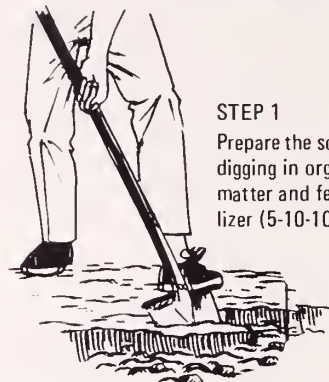
The care and feeding of a tomato plant can be as simple or as complex as you want to make it. We favor the simple ways.

feeding schedule

The tomato plant has a lot of work to do. An early variety is expected to produce a crop in about 60 days from the time the young plant is set out.

A vigorous main season variety will start producing in 70 days and continue production until cut down by frost.

SETTING OUT TRANSPLANTS

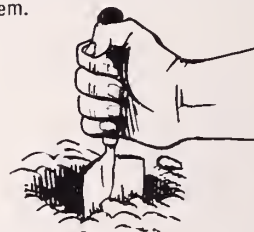


STEP 1

Prepare the soil by digging in organic matter and fertilizer (5-10-10).

STEP 2

Mark where you want each plant and dig holes deep enough to bury part of stem.



STEP 3

Soak holes with starter solution 6-18-6 about a half-hour before planting.



STEP 4

Tip from pot. Don't pull plant by stem.

If transplant is in a growing block, fibre pot, or peat pot, plant pot and all. Be sure edges of pot are buried to prevent drying out.

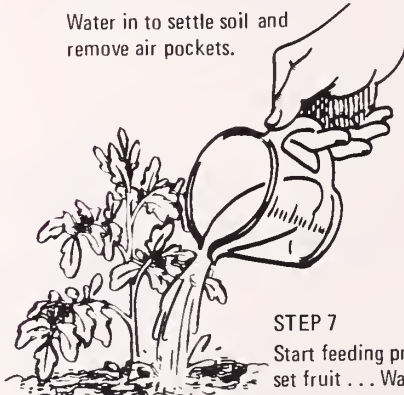


STEP 5

Put plant in hole so first leaf is just above soil. Roots will form along the buried stem. Firm soil around root ball.

STEP 6

Water in to settle soil and remove air pockets.



STEP 7

Start feeding program after plant has set fruit... Water with liquid plant food 12-6-6.

or

Spread a band of fertilizer 5-10-10 around the plant and water in.



The soil in which they are planted should have a good supply of nutrients—especially phosphorus. Use a fertilizer (5-10-10) when you prepare the soil before planting. For best results mix it into the soil when you add organic matter—compost, peat moss, ground bark and the like—to the area to be planted. Spread the material on top at the rate of three to four pounds per 100 square feet and work fertilizer and organic matter into the soil.

Water deeply and let the soil stand for about two weeks before planting.

When you set out a transplant don't forget the fertilizer (5-10-10). It has the phosphorus the newly forming roots require. It speeds up early growth and can increase the amount of fruit. Follow directions on the label.

No additional feeding is necessary until fruit is set. An additional feeding of fertilizer, 6-18-6 or 5-10-10, will increase both fruit and leaf production. This application may be all that an early maturing variety needs but main season and late varieties should be fed monthly.

watering

In the early stages of growth, before fruit has set, it is a good idea to put the plant under slight stress by stretching the interval between waterings.

After fruit has set it's important to maintain an even soil moisture. Fluctuating wet and dry spells is one way to bring on stunting of plants and blossom-end rot.

blossom-end rot

Symptoms of this disease appear as a leathery scar or rot on the blossom end of fruits. It can occur at any stage of development. It is usually caused by sudden changes in moisture in the soil. Blossom-end rot is most serious when plants growing rapidly with high soil moisture hit a hot dry spell. Lack of calcium in the plant is another cause of blossom-end rot. If you have had trouble with this disorder, do this: Before planting add 5 pounds of pulverized limestone (adds calcium), to 100 square feet. Mix thoroughly throughout the top 8 to 12 inches of soil. Mulch plants with black plastic or organic material to reduce fluctuations in soil moisture and temperature. Do

not plant in poorly drained soil.

Staked and heavily pruned tomatoes seem more susceptible to blossom-end rot than the plants trained without pruning.

pests and diseases

How much trouble you'll get from pests and diseases varies by the location, season and weather.

In some areas such diseases as early and late blight are expected annually. In such cases, rely on a brand name tomato/vegetable dust. It is a multi-purpose insecticide-fungicide and can be used as a dust or spray. Applied early and regularly on a one to two week schedule, it will control such diseases as Early and Late Blight, Septoria Leaf Spot, and Anthracnose. At the same time, the insects that attack tomatoes—aphids, thrips, leafhoppers, flea beetles, blister beetles, and tomato fruitworm—will be taken care of.

adding months to the tomato season

Early planting calls for some kind of help to increase temperatures. If you use the wire cage, a cover of polyethylene film in the early stages of growth will boost temperatures.

The covering of a row of plants with polyethylene film may be used for early planting with the row tent only 2 feet high. The cover should have ventilation.

Wind protection provided by plastic covers is as important as frost protection.

frost and wind protection

Inventive gardeners have worked out many ways to give the early planted tomato protection from late frost and cold winds.

Cone protection. You can manufacture your own "hot caps" by forming a cone out of plastic hardware cloth and a long pointed stick attached. It gives protection from frost and wind without danger of the heat buildup typical of hot caps. The size of the cone can be made to fit the plant.

Gallon-size white plastic jugs with bottoms cut out are useful as mini-greenhouses and insect damage preventers for tender young plants.

A-frame. An A-frame can be built and you can keep it warm on cold nights by putting large plastic bleach bottles full of water inside the A-frame. The sun warms the water during the day. At night it slowly gives off heat and keeps the A-frame several degrees warmer than the outside air.

holding fruit off the ground

Gardeners have worked out hundreds of ways to train plants so that the fruits are up off the ground. Almost any variety can be trained up vertically. Even the small bush (determinate) varieties will benefit by being tied up to 2-foot stakes or allowed to grow through a ladder-like frame a foot above ground.

The tall growing (indeterminate) varieties are grown on 1 by 1-inch or 2 by 2-inch stakes 6 feet long pounded 1 foot into the soil.

The market gardener aiming for the early (high price) market will sacrifice quantity and prune to a single stem removing all shoots (suckers) that grow out from the stem at the leaf axil. By this method he shortens the growing season and ripens fruit uniformly.

The home gardener can modify this system and get more fruit over a longer period by allowing one sucker to grow from near the base and form a two-stemmed plant and then remove all the rest of the suckers on both stems.

The disadvantage of the heavily pruned training is the lack of foliage cover to shade the fruit. In hot weather, damage from sun-scald can be expected. And pruned plants are more prone to develop blossom-end rot.

A modification of the heavy pruning method that gets early fruit production and later sun protection is to prune out all suckers up to about 18 inches and then let the plant bush out with the branches tied to the stake.

wire cages

For a main season variety the wire cage made of concrete reinforcing wire has proved superior to all other methods of training. The wire is usually 5 feet tall. A length of 5½ feet is needed for a cage 18 inches in diameter. The 6 by 6-inch mesh of this wire

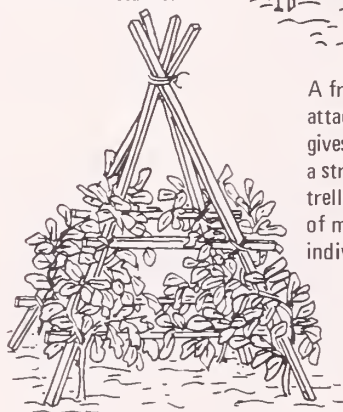
continued

tomatoes . . .

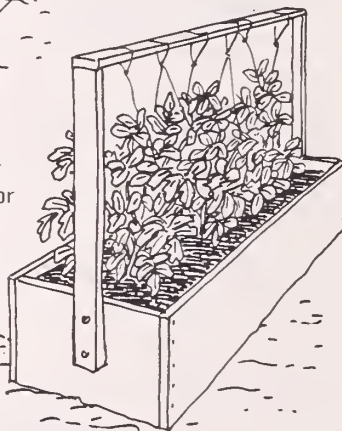
Support for tomato plants

Slats or sticks can be slid through wire fencing on each side of your plants to give support when and where needed without tying.

A compact group of 3 or 4 plants are held nicely on a teepee of 1" x 1" stakes.



A frame of 1 x 2s attached to a planter gives good support for a string or wire trellis—or the tying of many branches individually.



A cylinder of 6" mesh concrete reinforcing wire makes an ideal support. Keep branches inside wire until they reach the top.

Wrap plastic around wire for early protection.



Bend and crimp ends of wire with pliers as shown.

Use on almost any container or cut out cross wires at the bottom and push into the ground.

allows for easy picking of the fruit. The bottom rung should be snipped off so that the cage may be pushed 6 inches into the ground.

Yield of quality fruit will be higher in cages than on stakes. There is no shock from pruning, less damage from cracking and sunscald. The plant just grows naturally within the wire.

black plastic mulch

Black polyethylene does a good job

of keeping tomatoes off the ground and delivering yields equal to any type of training.

Field tests indicate that high fruit quality is possible when plants are allowed to sprawl naturally over the plastic.

Strong growing tomato plants should be given a space of 3 by 5 feet when grown on the plastic.

Temperature readings of the soil beneath black plastic show that the

increase is generally in the 3 to 6 degree range, sometimes only 2 degrees.

The temperature of the film itself soars high on hot sunny days and kicks back a great deal of heat to the air above it, rather than transferring it to the soil.

Black polyethylene is available in 1 to 1½ mils thickness, in rolls 3 to 6 feet wide. Get the 1½ mils thickness. See illustration for how to handle it.

Black plastic mulch for determinate tomatoes.



Dig a shallow trench and bury 3" or so of plastic all around the edge.

Listed below are some varieties that give excellent results in the Delaware Valley:

Indeterminate	Determinate
Rutgers	Spring Giant Hybrid*
Moreton Hybrid	Heinz 1350
Sunray	Pixie
Burpees VF	Roma VF
Beefmaster	
Supersonic	
Red Cherry	
Yellow Plum	

*Resistant to Verticillium and Fusarium wilts.

THE ELEVATED CONTAINER GARDEN

Created as a means to garden for a devoted horticulturist who has difficulty bending and stooping, the elevated garden offers vegetables and flowers in containers throughout the season.



by Doris Joiner



photos by Edmund B. Gilchrist, Jr.

Five weeks after first containers were put in position, the elevated bed's outlines—which later disappeared under an almost solid mass of growth—are still visible. Left foreground shows planks (laid on a crosspiece whose end can be seen at right) with corner supports of cinder blocks. Top blocks were placed at right angles to bottom both for design and to minimize tipping on any uneven gravel.

13

A puzzled passerby could scarcely be expected to guess the purpose of the planked platform that suddenly appeared near a corner of our front lawn. It was to be a therapeutic garden. In a few days a raised flower bed—more accurately, a *jardin-potager* (kitchen garden sounds less glamorous)—would begin to take form. Why therapeutic? Because it was thus I had resolved the problem of being semi-ambulatory due to a sudden hipbone malady. If I couldn't stoop to garden (nor, for that matter, twist, squat, or exert pressure on my right foot), why not bring the garden up to me? Besides, I was frustrated with inactivity and recognized the psychological imperative of an interesting new challenge. However, without my husband's support and muscles the

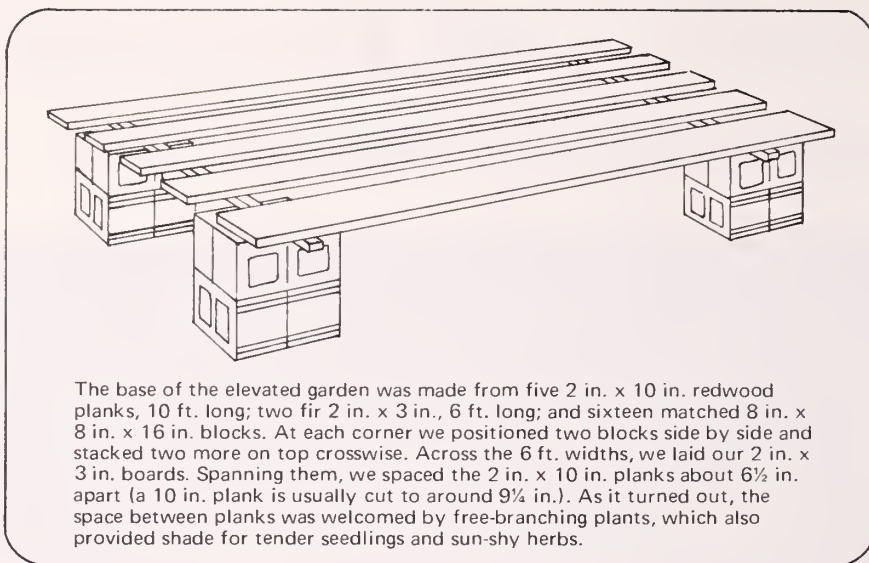
plans, carefully drawn early in spring of '74, would never have gotten off the ground.

On our grounds the only sunny spot available is an area bounded on two sides by corner flower beds, on the third by the drive, and on the fourth by the front corner of the house and adjacent ground cover. Instead of grass it is surfaced with gravel. Allowing sufficient width for access on all sides, a 6 x 10 ft. plot was decided upon. I did not want any construction that could not later be dismantled. Since we have a redwood fence and gate across the front of our property, and since it is the most impervious to rot, we chose redwood for the lumber. Several sketches and innumerable calls to lumberyards later (redwood is becoming a rare, ex-

pensive commodity), on May 2 our materials were delivered. (See illustration.)

A trip to a garden center completed the equipment and supplies: four plastic window boxes 36 in. long, 8 in. wide, 6 in. deep; six 10 in. and three 6 in. plastic pots; peat; sand; soil; fertilizer; and a multi-purpose garden dust. Lucky flea-market finds on hand were two stainless steel planters 9 in. wide by 5 in. deep, one 10 ft., the other 8 ft. long. Placed on the outside planks, they formed the east and west borders. I had already seeded the 8 ft. planter with petite marigolds, using seed tape. Unfortunately, an order for strawberries for the 10 ft. box never arrived. A gift of six strawberry plants and a jar, however, were used to provide balance: the filled jar at the south end

continued



of the 8 ft. box and one plant in either end of the longer box (by summer's end their runners threatened to take over the entire length). In it, too, interspersed with transplanted marigolds, I laid three sections of mixed lettuce seed tape. Two of the short window boxes were placed across either end, one sown to lettuce, the other to curly-cress, for an early showing of greenery. The other two boxes were placed down the middle of the second and fourth planks, one sown to roquette, the other to Detroit dark red beets.

I had visualized—and sketched—an oblong pyramid effect, with tomatoes and cucumbers in cages down center, tapering to low-growing plants around the perimeter. With an eye to symmetry, texture and color, it was simple to complete the basic design thus blocked out, using nursery plants, transplants and a few house plants for immediate effect. I had started dark opal basil, coriander and cayenne peppers in Fertil-cubes in late April. In addition to the 30 feet of planter boxes, eventually 60 containers varying from 12 in. diameter down to plastic cottage cheese cartons held the following plants: 4 basil, 1 chive, 3 coriander, 4 curly-cress, 2 fennel, 2 lemon balm, 1 marjoram, 2 mint, 4 oregano, 3 parsely, 1 rose geranium, 1 rosemary, 1 savory, thyme in a small strawberry pot, 3 bell pepper, 7 cayenne pepper, 1 Patio and 1 Pixie tomato, 3 Big Boy tomato and 2 cucumber in cages, 1 semperflorens begonia, 4 calendula (pot marigold), 3 chrysanthemum, 3 coleus, 1 marigold, and

even 1 Venus flytrap constantly in trouble for biting off more than it could chew.

The cylindrical cages of fence wire (about 36 in. high by 9 in. in diameter), a most welcome contribution from a friend, were plunged to the bottoms of the largest pots, an inch or more of gravel and shard thrown in, then the potting mix added. It was no small trick to maneuver the plants inside. These and other large pots were plastic or styrofoam, and in a few of them I used vermiculite or perlite as part of the mix. Consequently, the pots were not too heavy to lift about. For the most part I mixed soil, sand and sphagnum peat in equal proportions.

During the first month I kept a space clear at the north end (nearest the house) to use as a potting table, where I sat on a cushioned stool. Behind me four cinder blocks formed a low wall on which to place trailing plants, etc. I was able to work in this nook for long periods with little discomfort. The bed's dimensions proved to be most workable for my 5'4" height. I could reach to the very center. Plants were near waist level and the tallest tomatoes, topping at a bit over 5 ft. above the ground, were within range.

One night early in May my husband brought all the first plants into our family room, on the front ground level, because of a hail warning. He was to repeat the chore twice, once because of low temperatures.

By May 24 everything was flourish-

ing to the point where fertilization seemed indicated. The first time I used liquid fertilizer half strength (18-18-21 for the tomatoes and vegetables, 15-30-15 for the remainder); from then on biweekly I used full strength solutions.

On June 28 we picked our first tomato and the next day had a tiny "mess" of beet greens. A few weeks later we began picking hot peppers, which were spectacular all summer. On the three bell pepper plants we had a total of 16, which I allowed to become red for their color accent. By November, a second crop of peppers was maturing.

The garden was planned to provide its own pest control and it worked rather well: marigolds on all four sides supplemented by calendulas, plus basil and other herbs spaced around the perimeters. Nevertheless, when aphids threatened, I maintained a limited dusting program throughout July on the tomatoes, cucumbers, and peppers. A few times I isolated chrysanthemums or calendulas to rid them of aphid infestations. I had a 50 per cent cucumber crop loss, one of them dying after producing two fine specimens. A neighbor provided two replacements, one of which later died. Less than a dozen cucumbers matured during the whole season. Still, even that was fun. The last plant took off in all directions, quickly broke out of its cage and usurped every plant in reach. We drove a tall stake between planks on either side and gradually trained it on them.

As second or even third crops, I planted additional beets, coriander, cress, lettuce, parsely and roquette, as well as Short n' Sweet carrots, and radishes.

All the tomato plants bore satisfactorily, although the fruits were smaller than their potential. The lettuce tape was liberally sprinkled with Bibb, which never headed. Ruby and one other leaf type would be better choices. I would have liked to make another sowing of beets, which put on quite a show and grew quickly. The fresh herbs were a joy. In addition, I gathered coriander and fennel seed, made basil vinegar, chopped and froze basil—with and without added olive oil—dried oregano and hot peppers. Plans for repotting, harvesting and late planting in September had to be canceled or postponed be-

cause circumstances precluded anything except minimal maintenance most of that month.

Anyone contemplating this kind of gardening should be aware of the need for constant watering. During a prolonged heat wave I often watered twice daily, deeply in the morning, sometimes with a freshening shower from the sprinkler and, if the topsoil was dry later in the day, I watered enough to dampen surface roots. Pot saucers seemed of little use. I allowed top space in the containers for mulching, but decided it would only increase the difficulty of determining whether pots — especially plastic — required more moisture. Luckily, an outside faucet was near the bed and the hose could be handled with ease. Scalding water accumulating in the hose was run into a large watering can and left until the next day to dissipate its chlorine. I then poured it into a small can with a spout long enough to reach into small pots nestled behind larger ones.

We began talking seriously about a tent to protect from frost and permit continued growth. None too soon in September my husband drove 5 ft. supporting stakes into the ground at

each corner and midway down the length, plus one 6 ft. stake near the center point. We bought two heavy plastic drop cloths 10 ft. x 20 ft., which we seamed together on the 20 ft. side with all-weather tape. When temperatures dropped to 50° we covered the bed, securing the plastic on the ground by placing the hose around the entire perimeter and using empty flower pots as further anchors. During record low temperatures in October we left the tent in place a couple days at a time and were amazed at the steamy heat when we lifted a corner. Following this procedure we hope to extend the growing period well into November and postpone the inevitable chore of bringing many plants, especially herbs, indoors.

As the season progressed I began to recover from my malady; then unfortunately, another bone area required treatment. So throughout spring, summer and fall, 1974, my limited mobility, energy and positive thinking were focused upon my therapeutic garden. While weeds on the ground thrived and multiplied undisturbed, I took delight in pulling every weedlet that dared surface in a container. I spent daily

hours in the sun, grooming the marigolds, peeking under leaves (easy at eye level) for pests, rearranging pots for the most pleasing visual effect, taking photographs, watching vegetables grow and ripen, picking tidbits for salad variations, and chatting with neighbors and strangers who stopped to admire the project. The planks and blocks cost \$84; new planters and pots \$42; soil mixtures, plants, seeds, etc., brought the total to \$160. Perhaps not the cheapest therapy. Still, unlike that administered by technicians it is thoroughly pleasant and perhaps just as regenerative. At any rate, as a measure of its success and even with my expected complete recovery, I am planning to repeat the venture next spring.

Doris Joiner's interest in horticulture dates back to her childhood on a farm in Michigan. Her continued interest is helped through her membership in the Outdoor Gardeners of Montgomery County, which she joined to learn about herb gardening. The herb gardening rounds out Ms. Joiner's efforts at foreign cuisine which was stimulated during a four-year stint of work in S.E. Asia. She lives in Chestnut Hill.



June 12, little over a month after first containers were set in place, Ms. Joiner is shown seated at her "potting area" at end of the elevated bed, still incomplete and in its first stages of growth. Eventually containers covered every available inch, mainly with herbs. Tomatoes in the three center pots, as well as cucumbers at each side, quickly climbed to tops of their cages. Patio and Pixie tomatoes are behind them. Second plank from right holds hot peppers, a box of roquette, and bell peppers. Petite marigolds, first row at right, soon formed a colorful border. Note lettuce (planted April 24) in lower left corner, balanced at other end by curlycress, both of which are ready for the salad bowl.



Buttercrunch lettuce grown in greenhouse from February 14th to April 19th and ready to eat.

LETTUCE

- year-round in the greenhouse/cold frame/garden
- in containers
- under lights

three horticulturists share their
growing experiences with lettuce, an almost
indispensable vegetable.

lettuce year-round

by M. M. Brubaker

The home gardener can grow a steady supply of lettuce if he has available a cold greenhouse or a warmed cold frame for a few months in the winter. I have a preference for the Bibb type of lettuce and have enjoyed the widely offered Buttercrunch through both the winter and the summer.

Timing is most important if lettuce is required for salad every day. This timing must take into account a 50-day period from planting to eating in summer and as long as 75 days for much smaller plants in a greenhouse with a minimum temperature of 5°C. (40°F.). For the year-round supply, there are three types of culture: (1) summer growth in the open ground, (2) early spring and late fall in the garden under a plastic cover, and (3) use of a cold greenhouse or a cold frame with heating cables.

The season for lettuce in the garden can be extended at both ends by constructing miniature greenhouses to protect the outdoor plants. Any sort of frame covered with plastic will do. Coat hangers bent in a semicircle and put in the ground to arch over rows of lettuce can be covered with plastic. These are inconvenient to take on and off, however. I prefer a portable wooden frame about 10 ft. long and about 20 ft. wide onto which polyethylene film is stapled. The polyethylene deteriorates and must be renewed each fall.

With the plastic cover for protection, lettuce can be set out into the garden in early March in southeastern Pennsylvania. Buttercrunch seed planted in the middle of January, transplanted into peat pots early in February, will be ready to go into the garden early in March. To have Buttercrunch maturing in the garden every three weeks, seed should at first be planted about every 30 days, or the middle of January, the middle of February, the middle of March, and the middle of April. From then on, the interval between each seed planting can gradually be shortened until it is about 15 days in August. These intervals adjust for the shortening time to maturity as the weather warms, and the lengthening time to maturity in fall.

The latest garden planting of Buttercrunch can be seeded about the middle of September. A somewhat larger number of plants should be potted up at this time, in the hope of a mild winter and an extended harvest from the outdoor planting. These plants should be ready to eat about the middle of November. From then on the September sown Buttercrunch can be used from under the plastic well into the winter—with luck through December. As the weather gets colder, the plastic covers are insulated with a heavy layer of leaves around the base.

We turn to greenhouse lettuce as soon as the garden plants fail. The most convenient method I have found for growing greenhouse lettuce is to cut individual, small plants from peat pots. Plastic or clay pots can, of course, be used to save the cost of peat pots, but I shirk the job of washing pots whenever possible. Buttercrunch seed planted early in October, transplanted into pots late in October, and grown in a greenhouse at minimum temperature of 5°C., will start to yield small plants in late December. The plants can be grown in benches of soil or flats of soil and the timing will be about the same.

Greenhouse Buttercrunch planted early in December and transplanted early in January should be ready to eat in the middle of February. A little higher minimum night temperature will hasten maturity. For example, seed planted December 23, put into pots January 21, and grown in a greenhouse with a minimum temperature of 10°C., gave small plants which were cut on February 20. The time from seed to harvest will, of course, depend on winter sunlight and many other factors. Successive plantings for the greenhouse should continue through February. At that time there is a period of overlapping when a larger planting is made, partly for harvesting from the greenhouse and partly for setting into the garden.

I plant Buttercrunch seed for all the stages in small plastic trays in a "Peat-Lite" type of artificial growing medium. Seed is not covered with soil, but is just pushed into the wet surface, since exposure of lettuce seeds to light assists their germination. The tray is covered with a piece of glass or plastic sheet to prevent drying until the seeds sprout.

I haven't yet encountered any serious insect problems when growing lettuce outdoors. One year aphids were

continued



Buttercrunch seedlings planted March 13, grown at a minimum temperature of 45°F., and ready for the outdoor garden.

photo by M. M. Brubaker

lettuce year-round continued

troublesome on greenhouse lettuce, but this has only rarely been a problem. The worst trouble is from gray mold or botrytis, which can be serious at low temperatures under humid conditions. According to Wallace in *The Diagnosis of Mineral Deficiencies in Plants*, botrytis follows symptoms of calcium deficiency (margins of young leaves distorted and scorched). The best defense is (1) handle the plants carefully to avoid injury, (2) keep the foliage dry, and (3) make sure the plants get enough calcium. It may be advisable to water newly transplanted seedlings with "Benlate" fungicide in the winter, using the following formula:

"Benlate"	3 grams
Fungicide, 50%	(about 2 tsp.)
Water	4 liters
	(about 1 gal.)

When adequate superphosphate and minor elements are provided in the growing medium, a good fertilizer for lettuce in pots is:

Calcium nitrate (fertilizer grade)	2 tsp.
Potassium nitrate (fertilizer grade)	1 tsp.
Water to fill a large pail	

This can be used every watering, but enough should be applied each watering to flush about one-quarter out of the bottom of the pot.

Rabbits can damage any garden lettuce that is grown outdoors. I make protective wire covers from pieces of turkey wire about 13 ft. long and 3 ft. wide. These are bent in the middle, longitudinally, 90° to form a long, narrow tent. The wire is bent over to

close the ends.

Under plastic cover outdoors, or sometimes in the greenhouse, mice will eat the lettuce. Most households have ways of dealing with mice. If there are good places nearby to hide, slugs will cause damage, and for that reason mulch should be avoided.

This year-round lettuce schedule is somewhat arduous, but for those who think they must have salad with each principal meal, it can be considered a cash crop. The saving is good because you don't have to pay income tax on what you save growing this premium quality lettuce.

M. M. Brubaker is a frequent contributor to *Green Scene* (particularly see "Some Zucchini in a Tub," Volume 2, No. 4). He claims to "like just about any growing plant."

lettuce under lights

by George Elbert

The following information has been excerpted (with permission) from a letter written by George Elbert to a PHS member. Elbert is best known for The Indoor Gardening Book (Crown). He and his wife, Virginia, recently collaborated on Plants That Bloom Indoors (Simon & Schuster).

Growing vegetables under lights in the home is still in the pioneering stage and very little printed material of value exists. To grow lettuce, you will need at least a two-tube 48 in. fixture with reflector. With this minimum equipment you will be able to grow your lettuce to maturity under lights.

Seeding of the lettuce can be done in regular houseplant mix (according to directions on the packet) in a plastic sweater or bread box. The mix must be moist and at least 3 in. deep. Or you can pack moistened Jiffy-7's into the box and put a seed in each (they usually all come up). Cover the box and place it right under the lights until germination takes place and until the seedlings are pushing against the lid of the box.

Now comes the tricky matter. Lettuce has a long tap root and requires

deep soil. For larger heads a depth of at least a foot is required; you will need either large pots or window box types of containers. The latter will be too big to move around so they must be put on the bench before filling. The lights should be moved rather than the containers. Pots or boxes must be filled with a rich sandy mixture. Two parts peat moss, 2 parts perlite or 1 part vermiculite is a good formula. Alternatively, you can use sand with plenty of humus or leaf mold.

When seeding, allow good distance between the seeds or use the Jiffy-7's because lettuce does not like transplanting and you must try to lift out the plant without baring the root if possible. Before transplanting leave the top of the propagation box partially open for three days and entirely open for another three days to harden off the plants.

Now, move them to their new homes allowing at least 4 in. on each side for growth. Bibb lettuce requires little space, the spreading or heading varieties a lot.

After transplanting cover with a cone of paper for a few days until the transplants recover. Then place the

lights as near to them as possible or vice-versa. Three or even 2 in. away is fine.

The soil must be kept constantly moist, even wet. The lights must be on at least 15 hours a day. Feed the plants with Rapid-Gro or some other high nitrogen fertilizer as directed. Lettuce feeds very heavily and absorbs great quantities of water. Your plants should mature or head in about the time indicated by the catalog or seed packet. Misting them encourages good leaf growth.

Bibb lettuce can be planted close together and grows well, but is not a heavy producer. Oak Leaf and Salad Bowl lettuce are quick spready lettuces. Head lettuce (Boston) is compact and satisfactory.

The main problem for the amateur is handling a container with such a depth of soil and keeping it or them close enough to the lights. As the plants mature the lights must also rise or the container drop. The ideal situation is that at all times the plant should receive the same amount of light. Cool temperatures encourage slow but sound growth.

lettuce (et al.) in containers

by Charlotte Archer

I set out twelve small Bibb type lettuce plants in late April in a cuprinol treated bushel basket filled with garden soil diluted with compost and sand. They were fed often with diluted high nitrogen fertilizer when the other container plants were fed. An unexpected benefit from the high container was that the lettuce was not chewed (the lettuce that I planted in the ground was chewed). I harvested the Bibb in early June.

Et al. My next crop was bush beans.

The three squash on the left were two too many plants in a basket that could not be watered several times a day. I should have known that from Dr. Brubaker's article on the thirsty cucurbits (*Green Scene*, Vol. 2, No. 4). However, we harvested some before

the drought-stricken plants succumbed to white flies. The peppers only three feet to the right of the lettuce suffered from the lack of sun—four hours is not sufficient for a bountiful crop. Eight hours is ideal.

The patio tomato in the snail pot thrived all summer in a sunnier spot on the far terrace.

The small baskets in the center of the photo contain herbs.

Clearly, Charlotte Archer is a creative gardener. She says she is challenged by the semi-shady conditions in her garden and often must move the garden to the driveway to get the salad on the table. She takes great pleasure in broad-leaved evergreens, but her greatest horticultural interest is in landscape design. Archer was recently named PHS activities coordinator.



the green scene • may 1975



photos by Edmund B. Gilchrist, Jr.

naturalizing daffodils

AN INVESTMENT IN GOLD

 by Kitty Lapp

When we moved to a property with meadow, woods and a stream we had great ideas. We planted a formal garden with plenty of material for cutting. The little animals that lived there before we came thought we had great ideas too. They feasted sumptuously at our expense. After a few years of fighting and fencing, the creek flooded convincing us to give up. But a person with gardening in her blood doesn't give up for long, so in the spring when we found some daffodils blooming in the woods the wheels started turning. These bulbs had been brought by the flood to us from a wholesale grower about two miles above our property. If the creek could plant daffodils so could we. The daffodil bulbs were poisonous so we were not likely to have our crop stolen by rabbits, muskrats or woodchucks.

With the encouragement of two enthusiastic friends we were on our way. The woods had been stripped of almost everything worthwhile before we had moved in, so we could start from scratch. The first several thousand bulbs were easy—a few here, a few there, all carefully labeled. We knew that where there were thick growths of honeysuckle there was a need for daffodils, so out went the vines and in went the bulbs.

Each year as we planted more and more varieties it became harder to remember exactly where the older plantings were. The woods take on a very different appearance in the fall and frequently the spot we had mentally marked seemed to have disappeared when planting time came. We had relied on labels but after a few winter thaws, people tramping through the woods, or a fallen tree, sent the labels far from where they belonged.

We decided to mark the empty spots in the spring; the best way was to place branches where we planned to plant. As we plant we outline where each variety will go with small sticks, and place a label in the center of the area. Consequently, we have no problem tomorrow knowing where we stopped yesterday.

Daffodils have the same general colors; thus any variety looks well with its neighbor. However, the majority are yellow so we are sure to plant groups

The most important thing in this business of naturalizing daffodils is—don't look for bargains. Buy from a reliable dealer who can tell you which varieties don't mind fighting for their lives. The cheapest is frequently the most expensive.

of whites where they will accent the yellows. In naturalizing, at least 10 to 20 of one kind should be placed together. The blending gives a much more effective picture. No, we don't toss them to make them look as though they just happened that way. The bulbs fade in with the leaves and the ground so well we'd be sure to lose a few. We use no plan, we just get down on our knees and reach out in an arc, blending one variety with its neighbor.

We are lazy and unconventional, for we do not plant as deeply as the authorities suggest. (Nor did the creek!) We have found that in our soil the bulbs tend to pull themselves down and those planted too deeply have trouble blooming. We usually plant 8 in. to 10 in. apart to avoid overcrowding

when they start to multiply but where we want an immediate picture we put them closer. We have tried them all but have yet to find a bulb planter that takes less time and effort than a good sharp trowel.

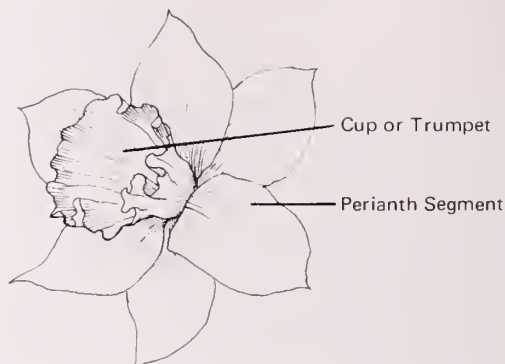
If we find a daffodil is in the wrong place or notice that a clump is beginning to produce mostly leaves and needs dividing we do not hesitate to transplant while they are blooming, for we find that NOW is the best time. We make sure the ground is damp, carefully dig and lift. A digging fork seems to work best. (I know of few noises more unpleasant than that of crunching into a clump of daffodil bulbs.) The bulbs are gently pulled apart, any questionable ones discarded and the remainder replanted where we want them. It is important to water just as with any relocated plant.

Labeling has been a problem. As I have mentioned, the names are often lost. There are many varieties that look so much alike we sometimes need an expert to identify them and since under different conditions of soil or light the color and shape may vary a little, even the experts can be stumped. We tried planting a living index in the meadow, putting in rows of single bulbs named, numbered and then cataloged, using a covering of hardy annuals to keep out the grass and hold the space, but many daffodils failed to thrive in the open meadow and the index was not a success. We have decided that labels do not enhance the beauty of a naturalized area so we have given up the struggle.

We deadhead by picking fresh blooms for our friends; the remainder we don't worry about. It is amazing how few seeds are set but we do frequently wonder whether Nature has

continued





hybridized any new varieties for us. We don't cut any more leaves than absolutely necessary, and unless flowers are wanted for show we don't cut the stems to the ground for they too help to manufacture food for next year's bloom. We have accepted the fact that after the flowers are gone there will be a time when we will look unkempt, but that is a small price to pay for several weeks of beauty. Early morning or late afternoon is the best time to pick (and also the best time here for photography because the sun is slanting through the woods then). After picking, we put our bouquet in a bucket of warm water to harden. We try to keep on hand a supply of taxus or small leaf ilex so that our gardenless friends will have some greens to arrange with their daffodils.

We have naturalized in two ways—in the meadow and in the woods (mostly deciduous). The woods is much more to our liking for we don't have the problem of seeing unsightly leaves dying and there is no temptation to mow before the leaves have finished nourishing the bulbs. We feel braiding or tying the leaves is almost as bad as cutting since frequently severe injury inhibits the plant's use of nutrients. Another advantage of naturalizing in the woods is the protection given by the shade. During long periods of drought such as we had a few years back the moisture is retained and the bulbs do not suffer as they would in a sun-drenched area.

Unlike some flowers whose season has been greatly prolonged, daffodils mean spring only. Needless to say we have planted the very early and very late varieties in order to hold spring as long as possible. It is difficult to suggest a list because for obvious reasons some favorites will have to be omitted. See box for our recommendations.

We have never gone in for the new introductions because they tend to be very expensive (example, Desert Fox @ \$120 or Fort Knox @ \$108) and

Early

Binkie	Clear sulphur lemon, trumpet changing to white.
Carlton	Soft, clear yellow.
February Gold	Golden yellow, very early.
Fortune	Deep lemon yellow perianth, long orange red cup.
Grape Fruit	Pale lemon deepening to greenish lemon. Large trumpet.
Lord Nelson	Clear yellow with wide trumpet.
Patria	Lemon yellow with long trumpet.
Peeping Tom	Long slim deep gold trumpet with reflexed perianth, our first
Rococo	White perianth cup ivory with band of orange apricot.
Trousseau	Yellow trumpet changes to cream. Perianth white.

Mid-Season

Actaea	Broad white perianth. Eye lined with red.
Agathon	Medium yellow. Large.
Apricot Distinction	Apricot perianth with orange cup.
Beersheba	Pure white. Long trumpet edged with frill.
Burgemeester Gouvarneur	Large yellow with long trumpet.
Charity May	Soft clear yellow. Reflexed perianth. Lasts well.
Cheerfulness	3-4 blooms. Sweet scented. Double white perianth. Creamy center.
Chungking	Yellow perianth. Deep red crown.
Golden Perfection	Golden yellow with short cup. Large.
Golden Scepter	Deep yellow. Large cup.
Joseph MacLeod	All yellow. Free flowering. Increases well.
Kingscourt	Golden. Straight trumpet.
Mary Copeland	Double. Creamy white outer petals. Center lemon and orange red.
Mount Hood	Pure white (cream when first open).
Red Devon	Clear yellow perianth. Frilled crimson red crown.
Red Goblet	Deep golden perianth. Orange red crown.
St. Louis	White perianth, small yellow cup with red edge.
Selma Lagerlof	Greenish yellow. Crown edged with orange.
Spellbinder	Perianth light lemon with greenish cast. Trumpet deeper lemon.
Sun Chariot	Bright yellow. Orange red cup.
Unsurpassable	Clear yellow perianth and trumpet. Large.
White Lion	Double. White outer petals. Center soft yellow and white.
Yellow Cheerfulness	Like Cheerfulness but yellow.

Late

Fermoy	White perianth. Orange red cup
Frigid	Icy white with emerald eye. May.
Geranium	White perianth. Deep orange red cup, 4-6 on stem.
Kilworth	Large white perianth. Crown dark orange red.
Liberty Bells	Deep lemon yellow, 2-4 dainty bells on stem.
Limerick	White perianth. Dark red eye.
Martha Washington	White perianth. Yellow cup edged with red. Fragrant.
Mrs. R. O. Backhouse	Ivory perianth. Trumpet shell pink, deeper at brim.
St. Egwin	Good yellow. Large cup.
Silver Chimes	White perianth. Primrose cup. 6 or more on stem.
Thalia	Pure white. Orchid-like. 2-4 on stem.
Tresamble	Pure white. 4-6 on stem. Generous bloomer.



Vernon Lapp picks daffodils on a warm April day.



Farther into the woods near the Lapp's Hatboro home. Photo represents a tiny corner of the masses of daffodils.

sometimes uncertain. There is such a wide range in season and color in the old favorites that we find no need to gamble.

It is interesting to notice the change from yellow masses predominating early in the season to the almost completely white show near the end of the blooming period. Mainly the large trumpets come early and the flat cups late. We come across an occasional fragrance at the beginning of the spring,

but toward the end the air is full of delicious scents.

August would be the ideal time to plant; however, growers traditionally plant for fall shipments thereby making it impossible to plant at the ideal time. Planting early is important so the roots can get well established before the ground freezes solidly. When thawing occurs growth is renewed and some winters we have an amazing number of leaves showing. If very cold weather

returns, the tips may turn brown but the flowers come through on schedule unharmed. A late March or April ice storm often knocks down the bloom, but unless the stems are broken these hardy beauties snap back to attention when the ice melts.

People frequently ask the difference between narcissi, daffodils and jonquils. *Narcissus* is the Latin name, interchangeable with the English name of daffodil. Jonquil is merely one of the eleven divisions of the family. Jonquils are usually golden yellow, small-cupped and sweetly scented. For those entering shows it is important to know the various divisions but most of our visitors are interested only in the flowers themselves.

K.L.

Along with the daffodils, we are naturalizing wild flowers; the contrast of color and texture complements one another. We are especially delighted with a stand of *Mertensia virginica* (Virginia bluebell) that seems to thrive with us. *Erythronium* (dogtooth violet) and muscari (grape hyacinth) which have come from friends living along streams also do well and bloom with the daffodils. Ferns and other wildings help to hide the daffodil leaves as they become unsightly.

The most important thing in this business of naturalizing daffodils is—don't look for bargains. Buy from a reliable dealer who can tell you which varieties don't mind fighting for their lives. The cheapest is frequently the most expensive. If you insist on buying a naturalizing blend make sure the bulbs are named and that there are several of each variety so that you do not have a spotty planting. With inflation and the price of gold advancing, what better investment can you make than daffodils. Buy them, bury them and watch your gold increase spring after spring.

Kitty Lapp has planted more than 100,000 daffodils in the woods adjacent to the Lapp home in Hatboro. In addition to the naturalized daffodils, she and her husband have also planted many varieties of hollies on their property. Recently, alarmed at the excessive destruction of wild flowers by bulldozers, they have successfully begun to naturalize wild flowers.

WELCOME TO BOWMAN'S HILL



by Bebe Miles



Photo by Mellon

Bowman's Hill Tower framed by dogwood

Bowman's Hill State Wildflower Preserve is a magic place at any season, but springtime is special. From late April to the end of June there is no comparable spot in all of the Northeast where you can see so many different kinds of native plants. Located in the upper section of Washington Crossing State Park on Route 32 a few miles south of New Hope, Pa., the Preserve is now anticipating its 41st spring show.

Although limited by choice to plants indigenous to Pennsylvania, the Preserve is home to most of the best flora of the east because the Keystone state is geographically situated so it serves as a meeting place for both northern and southern genera.

Since its founding upwards of 298 species of flowering plants, 148 trees

and shrubs, 21 vines and 33 ferns have been planted along 17 trails. Area garden clubs that sponsor individual trails, an active corps of volunteers plus commonwealth funds for staff and maintenance combine to support a unique sanctuary for American flora not far from Philadelphia's city line.

What makes it so special is that here you can see our American plants growing under natural conditions. The 100 acres included in the Preserve encompass varying habitats of sun or shade, dry or damp and of differing soil acidity. With such extremes of habitat available, plants from places as widely diverse as the Poconos, the Great Lakes area of Pennsylvania and the warm southern tier are equally at home.

There are two exceptions to the natural habitat plan. Most important to the public is the exhibition garden immediately adjacent to the Headquarters building. Not yet completed, this section has been designed primarily to show visitors some of the best native plants for home gardening. In season its collections of such favorites as trilliums, phlox and lobelias serve as examples and inspirations. So far about 40 species have been established there.

Less flamboyant but of great importance to the future of the Preserve are the propagation beds. Tucked away from public wear and tear are several special spots where thousands of plants raised from seed are nursed until of sufficient size to compete on the trails. During the past season over 1500 plants

went from nursery beds to homes on the various trails. Small trees and bushes, too, are often given a year or two of protection before being moved into permanent sites.

The Headquarters building is the ideal place to begin an initial visit. In addition to seasonal exhibits, it pro-

A colony of celandine poppy is a showstopper.

vides a warm, protected spot to view a large outdoor bird-feeding area. Although most popular during the winter, the Sinkler Bird Observation Station logs such colorful spring and summer visitors as rose-breasted grosbeaks, indigo buntings and scarlet tanagers. Downstairs is the Platt Bird Collection, a mini-museum featuring the nests and eggs of most of the birds of America.

But we are primarily interested in flora, so be sure to ask at the office for a current bloom guide. If you are new to Bowman's Hill, spend a quarter for a map too. The free bloom guide lists some of the highlights of plants in flower for that particular month with the name of the trail where a stand of each is to be found. By synchronizing map and guide, you can see the most species in the time at hand. Many of the more common plants such as bloodroot, spring beauties and mayapples are omnipresent in certain areas, but such outstanding Americans as pink ladyslippers, eastern columbine or crested

iris must be searched for. In season selected native plants and seeds are for sale at the Headquarters.

the trails

Everyone has a favorite trail. Except for the Ecology Trail, each named walk more or less winds in a circle, seldom more than several hundred feet long. Many intersect, but with map in hand, you are less likely to go off on a tangent. The end of each trail is usually a short distance from its beginning.

Close to the Headquarters' parking lot, the Parry Trail features a particularly varied number of species as it descends from a wooded slope into a flood plain area. The nearby Bucks County Trail makes a fine introductory nature walk for children; free self-guiding sheets to the latter are available at the Headquarters.

Not far below the parking lot is the Marshmarigold Trail. In early spring its tiny pond is golden with the plants for which it is named, but there are many other genera that like wet spots, as well as several unusual violets. A colony of celandine poppy there is a showstopper.

Across the creek is the Bluebell Trail where in late April the lower sections are azure with mertensia. Its entrance and a short loop at its exit are gay with mixed species during spring and summer.

The nearby Azalea Trail has a good collection of plants preferring dry, wooded slopes, but like the adjacent Azaleas-at-the-Bridge, it is of particular

interest in late spring when the native rhododendrons bloom. Don't miss its gay wings or overlook the box huckleberry.

As the automobile road begins to climb, it passes the Sphagnum Bog. Here in a small area under very special conditions that require constant attention to the water table and soil acidity, more than 50 species thrive. Notable among them are *Helonias bullata*, *Calopogon pulchellus* and *Rhexia virginica*.



Toad trillium (*Trillium luteum*)

Last year the flowering pitcher plants captured the interest of every passerby during June. Behind the bog the Audubon Trail winds in and out of the woods and along a small creek, providing a diverse habitat for birdwatchers.

Although not really very far from the Headquarters, another complex of trails is closer to the upper parking lot. When volunteers are available, an information booth is open here during the warmer months. Among a myriad of plants great sweeps of meehania, *Phlox divaricata* and *P. stolonifera* make the Wayside Trail especially noteworthy in May.

Only a few steps away is the Wherry Fern Trail. In midsummer its varied greenery is a cool and lovely oasis, but its springtime shows are many. One is a great colony of blue-eyed Mary, another a triangular slope studded with spring larkspur, rue anemone and a large plant of Dutchman's pipe. One whole bank is bright with the yellow *Chrysogonum virginianum*, a native every gardener should get to know.

From that trail the visitor gets glimpses of the pond area and the nearby Gentian Trail. American gentians bloom in fall, but this walk has spring and summer stars as well. Outstanding are swamp buttercup, cardinal flower and clethra. City children are intrigued with the pond where many



Trillium grandiflorum

Photos by author

continued

see their first frog kerplopping into the water. The botanically-minded remember plantings of ferns, lizard's tail and spatterdock.

In this area too is the Lloyd Evergreen Trail where the emphasis is on plants that retain their leaves all year.

Across the road from the upper parking lot are two trails recommended for the oldest and youngest nature lovers because the few grades are very gradual with most of the walk fairly level. As its name suggests, the Medici-

nal Trail specializes in plants with pharmacological uses, but its trillium display is one of the best anywhere. Among its many treasures is a large stand of twinleaf (*Jeffersonia diphylla*), the symbol of the Preserve. Only a few yards away is the Harshberger Trail, another very well-planted walk where you may discover such delights as flame azalea, fire pink and native lilies. Early spring visitors are always entranced by the Fraser sedge beside the rustic bridge.

Farther up the road on the way to the tower is the Poconos Laurel Trail. In June the state flower of Pennsylvania paints its slopes with pink, but this is also a mycologist's paradise in a wet summer.

Smaller specialized areas within the park include the Aster Walk, Cornus Bend, the Holly Walk, the Little Meadow and the Naturalized Plant Trail, which features established escapes from other countries like the blackberry-lily.

Mention should be made too of Penn's Woods, a section adjacent to the Headquarters. Here are a large percentage of the trees native to the commonwealth. A new map is available for groups particularly interested.

None of what you see at Bowman's Hill is pure happenstance. Without the efforts of the volunteers and the sponsoring clubs, weeds and the forest itself would have reclaimed these gentle hills and valleys for themselves long since. While every effort is made to keep the plantings on the trails as natural-looking as possible, work constantly goes on.

Should you encounter a disheveled group with trowels, look for an arm-band with the yellow and green Bowman's Hill patch which marks them as honest toilers not plant robbers. They may be setting out a new colony they have raised at home or merely weeding out some invasive plant so a more delicate native can compete on equal terms.

And if that looks like fun, leave your name at the office. Volunteers are always welcome to work at Bowman's Hill; most admit to learning a lot on every work detail.

If possible, avoid a weekend visit to the Preserve during the spring. Auto traffic in the area is unbelievable, and the woods lose their magic when there are too many people. In contrast, on a weekday you may well have a whole trail to yourself except for birds, squirrels and perhaps a stray turtle.

Bebe Miles is on the executive committee at Bowman's Hill State Wildflower Preserve and currently heads the committee that takes care of their Bluebell Trail for the Doylestown Nature Club. Her book, *Bluebells and Bittersweet*, covers the best American plants for home gardening. A craft book, *Designing with Natural Materials*, is being published this year.



Silene pensylvanica



Clethra alnifolia

photos by author

ROSES IN DEPTH



by Léonie Bell

If you want to learn the ins and outs of growing lovely roses, read no further. Any library can produce a selection of good "how-to" books about them. A new one must be published or an old favorite revised every year, or so it seems.

The rose titles I'd like to call to your attention are those that have helped me most, over the last twenty years, to learn how to tell the old roses apart. Rose nurserymen do not always know the correct names of the plants they ship out because they tend to go by the name of the stock as it came to them, or their labels might have gotten mixed up. For whatever reason, several of the grafted roses that were first planted in our garden turned out to be incorrectly labeled—and this, after a wait of one year's growth before the plants bloomed, sometimes two!

The only help seemed to lie in the old rose books, those written by people who knew the roses in the years they were introduced and first grown.

Our PHS Library has an outstanding collection of such books, superior in some instances to that of the American Rose Society itself. When I began to study these nineteenth-century works, members were still permitted to take home a few small volumes at a time, no matter how old. Often, my renewal date was the single entry in the back of a book. To borrow the bulky, rare *Roses* by Andrews, however, insurance was required. Sadly, few of the books of that century could tolerate much use because of the sulphite (woodpulp) paper used. Folds came apart at the stitching, the pages tanned quickly, turned brittle and were apt to crack at corners. If rebound, a book could no longer lie open flat for copying. It was understandable that the more valuable titles were eventually removed from circulation and later put into safe, properly humidified storage elsewhere.

These rare books can be seen, however, in the PHS Library if a request is made well in advance.

Henry C. Andrews' *Roses*, begun in 1805 and added to for 23 years, is to me a particularly fascinating book, as are all those written by rosarians who also grow and illustrate their own material. While his contemporaries, and in recent times Wilfred Blunt in *The Art of Botanical Illustration*, scorned his "strident" colors and lack of botanical knowledge, his study has great integrity. He gives us the only illustrated record, for example, of seven forms of *Rosa centifolia*, the Cabbage Rose, from single to very double, most now lost. He pointed out that "*Rosa lucida*" (now *R. virginiana*) occurs in a number of doubled forms, just as does *R. gallica*. Considering he did his own engraving as well as hand-coloring, the crudities of some of his plates can be excused when one realizes the value

I have often wished I were older, old enough to have helped illustrate Mrs. Keays' book for which she had to trace details from Redouté in a frail, unsteady hand.

of his comments.

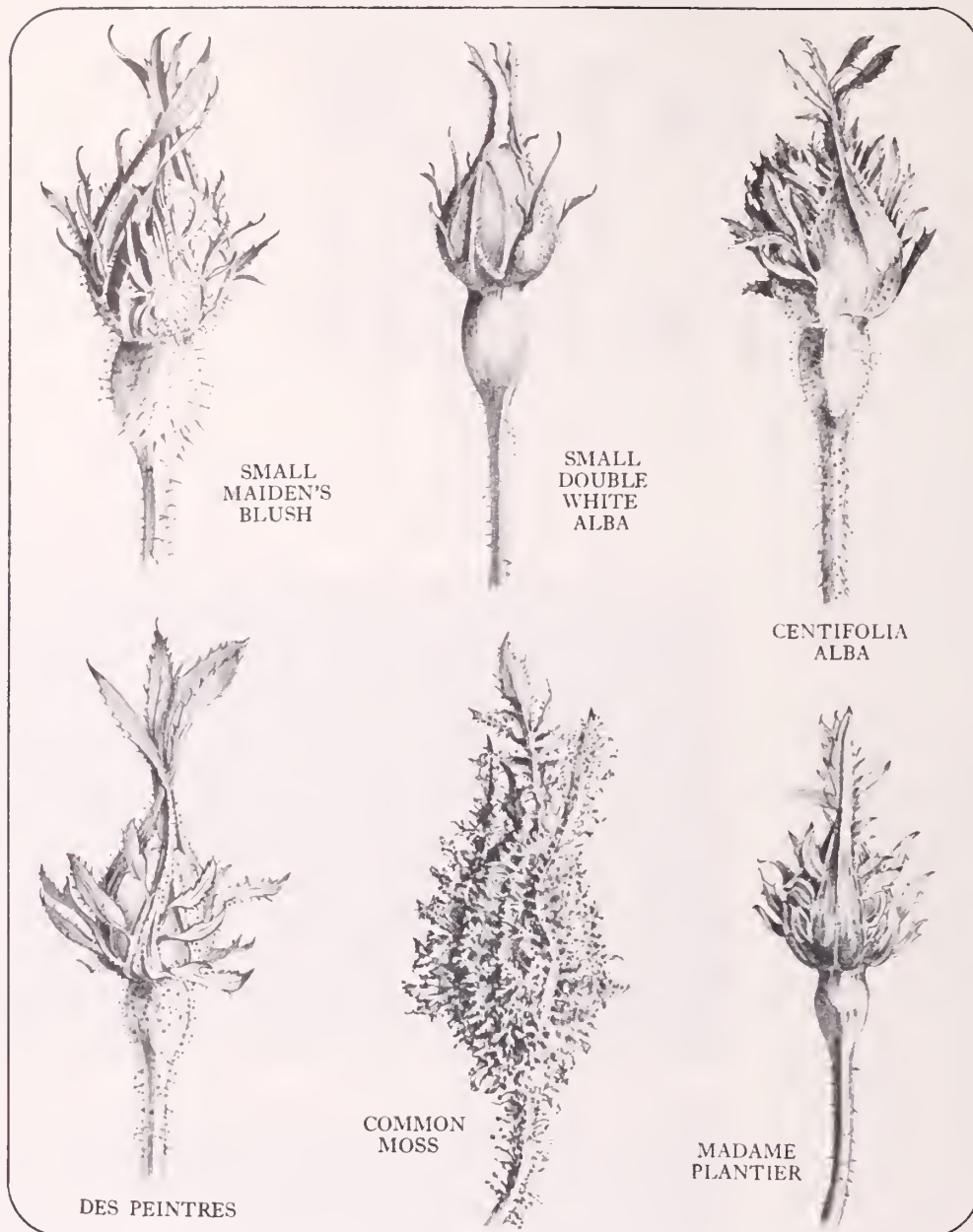
Few libraries own the three original volumes of Redouté's *Les Roses*, 1817-1824. The plates have been reproduced so often that this hardly matters, because the work was a collaboration from its inception. Redouté painted watercolors, which were then copied by five engravers; he did supervise the final coloring using his own technique of stipple engraving. But he was not a botanist and he had a tendency to glamorize. What is actually most valuable about *Les Roses* is the text by C. A. Thory, added to by M. Pirolle in later editions. To the rose sleuth, the third edition of 1828-1829 is by far

the most informative. I often wonder why Thory's and Pirolle's observations have never been published in their entirety in English. Eva Mannering's abridged descriptions in the Ariel Press editions of prints are frustratingly useless.

In contrast to Redouté's lush engravings are the small, hand-colored studies of oriental rose species as they began to reach England. These can be seen in the handsome volumes of the *Botanical Magazine*, begun in 1787, of which the PHS Library has a complete set. Drawn and engraved by artists who were also botanists, they have a commendable degree of accuracy. One example still impresses me. When studying early portraits of *R. bracteata*, Lord Macartney's Rose, I discovered that neither Redouté nor Andrews had caught the unique characters of this astonishing plant that came to England the same year Slater's Crimson China appeared, in 1792. Yet there on one small page of the *Botanical Magazine* some artist, possibly Sydenham Edwards, had succeeded in delineating its three distinctions clearly.

Rose portraits alone, though, are not enough. In 1837 appeared the first of several small books without illustration of any kind, but crammed with neatly classified descriptions of literally thousands of roses, that were to be the antecedents of the commercial catalogs of years later. Thomas Rivers produced the first, in London. Then came Mrs. Gore, an English woman who lived in France: her thick *Rose Fancier's Manual* of 1838 provides us with the most comprehensive survey to be compiled in the early nineteenth century. By 1844, Robert Buist, a Scotsman, was sufficiently established in Philadelphia to write a book-catalog of his own. William Robert Prince up in Long Island followed suit in 1846 but his is hardly original: most of it is plagiarized

continued



Drawings by Frances L. Bunyard. From p. 66 *Old Garden Roses* by Edward A. Bunyard.

from Rivers, warmed over with an occasional fresh observation. Of these four, the library lacks only the Prince.

The first Hybrid Perpetuals began to occur in French nurseries in 1842. The best presentation of these introductions is Henry Curtis's *The Beauties of the Rose*, issued in two volumes (1850 and 1853). The library owns the pair in mint condition, the gift of a member several years ago. Very few copies exist this side of the Atlantic. Again, it is almost entirely the work of one man whose personal experiences with the 38 roses he chose to portray indicate an affectionate familiarity with their strengths and weaknesses. Of all the nineteenth-century books I have come to know, this pair most deserve facsimile reproduction.

William Paul began his exhaustive

series called *The Rose Garden* in 1848. He followed it with eight revisions that changed in rose names if not in basic content. I have the first and eighth (1881) editions because they represent both the extremes of taste in rose fashion and the methods of color reproduction, from hand-colored engraving to stipple engraving to chromo-lithograph.

Meanwhile, in Rochester, New York, Henry Ellwanger published a small fat book of rose theory and varieties in 1882 that described succinctly 956 roses. He was to revise and add to his lists for the next thirty years. For all their brevity, his notations are invaluable as indication of what was grown in this country at the turn of the century. No rose plates here, but the unusual text compensates for their absence. Ellwanger's book was the last of

the small, catalog type rose books.

Several notable rose titles were produced early in this century by English women. Each has its strengths. Rose Kingsley's *Roses and Rose Growing* of 1908 has the most complete lists of certain classes of roses that were later to be eclipsed, like the true tea roses. Gertrude Jekyll regarded roses primarily as drapery over pergolas or stitchery against walls. Her *Roses for English Gardens* is valuable chiefly for its wealth of black and white photographs, sometimes clear enough to help in an identification. Ellen Willmott attempted to write the definitive treatise on *The Genus Rosa*, with appropriately handsome color plates and all the botanical information available around 1910, but it turned out to be a huge, expensive, dismal failure.

Fortunately, I started out on this rose odyssey with two books of the mid-thirties, not unlike in content although completely different in design and appearance. One, *Old Roses*, was written by Mrs. Frederick Love Keays about her own found roses and research in Calvert County, Maryland. Hers was followed, in England, by the equally well organized *Old Garden Roses* in 1936 (1937 in New York), by Edward Bunyard. The pair were an excellent introduction to the mysteries of old roses then and, to my mind, remain treasured guideposts, ones that *had* to be found and bought.

What was so unusual was that they both went back to the original classifications of roses, instead of making the old sorts fit into modern categories; once these were understood, many things began to fall into place.

Because she confined her efforts to roses, Mrs. Keays is not well known as an American horticultural writer of great charm and intelligence; yet she is easily the peer of Louise Beebe Wilder, Alice Morse Earle, and, in England, Gertrude Jekyll. I have often wished I were older, old enough to have helped illustrate her book, for which she had to trace details from Redouté in a frail, unsteady hand. Nonetheless, her instinct for the family of some old rose without a name was and remains uncannily accurate. She also wrote articles about later rose discoveries for the American Rose Annuals—13, in the 15 years between 1932 and 1946—that are worth perusing.

Bunyard's approach was to provide one superb photograph in gravure of a rose that typified each class. While lovely, these are a bit too contrived to be useful. What appeals to me most in his book are the three pages of rose leaves and buds, rendered in pencil by his wife. These were the inspiration for the drawings I made many years later for *The Fragrant Year*.

The longest study of the genus by an American, *The History of The Rose* by Roy Shepherd, published in 1954, ought to be the single guide we need. Instead, it is a work of constant frustration. Knowledgeable as Shepherd was, I remain bothered that he never told of Lambertus Bobbink and his importation of more than 3,000 roses from a French estate sometime in the 1920's, a collection that was to be dis-

seminated to every public rose garden in the country, then exported back to Europe, abounding with misidentifications—though through no fault of Mr. Bobbink's. Here is a rose mystery that begs to be solved, and the old Bobbink & Atkins catalogs give no help.

If you are serious about learning more of the history and evolution of roses, the unquestioned modern authority is Graham Stuart Thomas. His trilogy—*Old Shrub Roses*, 1955 and 1961; *Shrub Roses of Today*, 1962; *Climbing Roses Old and New*, 1966—explains both species roses and old garden hybrids as thoroughly as is possible at present. Once again, we are indebted to a multi-talented individual who has given us three books, planned so as not to overlap, each rich with the personal observations of a dedicated rosarian. Thomas can draw, paint, and photograph as well as write, entrancingly, about this genus that has some of us in lifelong thrall.

Allowance must be made, of course, for his English viewpoint and the advantages of Gulf Stream warmth. Not to be overlooked in his first book, *Old Shrub Roses*, are the theories of Dr. C. C. Hurst, accompanied by that botanist's own superb bibliography. May his publishers elect to keep his books in print for years to come! They might well form the nucleus for any rose library.

In my own book, *The Fragrant Year*, while expounding on their many perfumes, I tried also to provide a résumé of garden roses that would hopefully give a clear idea of how our present hybrid tea roses came to be. The chapter, "Just Roses," is as good an introduction to their history as can be found in current books, but it remains only that, an introduction. Most rose books these days are expensively produced collections of pretty pictures, heavy on color, short on information. The definitive book on old roses that flourish in our gardens, parks, country roads, and cemeteries, has yet to be written.

●

Léonie Bell has a "show-me" attitude about plants, their scents, their performance, their identification. Besides salvaging old roses, she is deep into ivies and garden photography. She is chairwoman of the Whitmarsh Township Shade Tree Commission.

books

The following books mentioned in the article can be seen in the PHS Library:

- Andrews, Henry C.
Roses
H. C. Andrews, London, 1805-28
- Bell, Léonie & Helen Van Pelt Wilson
The Fragrant Year
Barrows & Co., New York, 1967
- Blunt, Wilfrid
The Art of Botanical Illustration
Collins, London, 1950
- Buist, Robert
The Rose Manual
Buist, Philadelphia, 1844
- Bunyard, Edward
Old Garden Roses
Country Life, Ltd., London, 1936
- Curtis, Henry
The Beauties of the Rose
John Lavars, Bristol, England, 1850-53
- Curtis, William
Curtis' Botanical Magazine
Curtis, London, 1787
- Ellwanger, Henry
The Rose
Dodd, Mead & Co., New York, 1892
- Gore, Catherine Grace Frances
The Rose Fancier's Manual
H. Colburn, London, 1838
- Keays, (Mrs.) Frederick Love
Old Roses
Macmillan, New York, 1935
- Paul, William
The Rose Garden
Kent & Co., London, 1888
- Redouté, Pierre Joseph
Les Roses
Preface by Eva Mannering, Ariel,
London, 1963
Facsimile: Collins, London, 1954
Text: C. Stuart Gazer, American
Engr. Soc., 1941
- Rivers, Thomas
The Rose Amateur's Guide
Longman, Brown, Green and Long-
mans, London, 1843
Shepherd, Roy E.
History of the Rose
Macmillan, New York, 1954
- Thomas, Graham Stuart
Old Shrub Roses
Phoenix House, London, 1955
Shrub Roses of Today
St. Martin's Press, New York, 1963
Climbing Roses, Old and New
Phoenix House, London, 1965
- Willmott, Ellen Ann
The Genus Rosa
J. Murray, London, 1914

FLOWERING DOGWOODS

and some of their kin

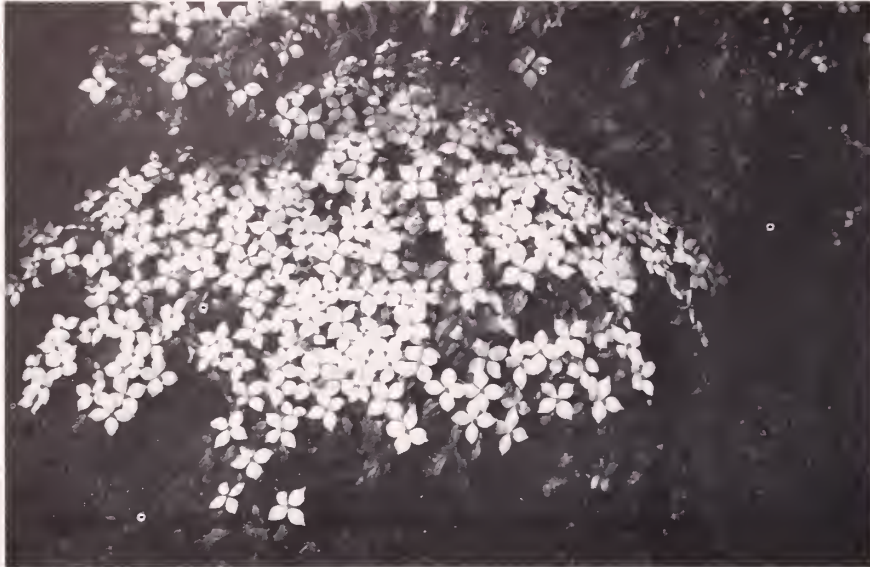


photo by G. Wister

Cornus kousa (June)

The Tyler Arboretum is blessed with flowering dogwoods. They wander through the woodland; they cluster in open fields, where birds scattered the seed, after farming was abandoned. The several years before the fields were mowed gave the seeds a chance to grow. Among these younger trees are some that blush a delicate pink.

In addition to these spontaneously-occurring trees, we have a collection of about 30 named cultivars of flowering dogwood (*Cornus florida*). Some are on the edges of the parking lot, some in the field beside the barn, and some, including several clones of pinks and reds, are to the right of the road after it crosses Rocky Run below the barn. Some are near the main drive beyond the Stone House and the greenhouse. Among all these you will find variation in leaf shape and coloration, some with yellow fruit, differing tree shapes, and, in the flower clusters, variety in size, form and color.

When we speak of the flower of a flowering dogwood, we are actually speaking of a cluster of tiny yellowish florets, surrounded by four large showy petal-like bracts. In winter, the bracts cover the cluster of flower buds closely. In April, they start to expand from the base, but the portions that covered the buds remain the same size to form the characteristic notches at the tips of the bracts.

So well known is the flowering dogwood that it may seem unnecessary to write about it. But often we do not fully realize how fortunate we are in a native plant, and hanker after a foreign beauty not adapted to our conditions. The flowering dogwood gives us four crops of beauty. In spring, the "flowers" expand slowly to give a long season of bloom. It is one of the first of our native trees to color up in early fall. After the leaves fall, the red fruits give shining color until they are eaten by the birds. In winter, the tree has an interesting silhouette, with the lavender-tinted twigs holding the fat flower buds up to the sky.

The flowering dogwood is no trouble to grow. In fact, we may find ourselves pulling up unwanted seedlings in our gardens. The deeper red and pink varieties are somewhat harsh in coloring when they are opening, and must be placed with care. The paler pinks are easier to blend with other plants. And nothing can surpass the beauty of the pure whites. The trees adjust themselves gracefully to their neighbors, a valuable trait in a mixed planting.

Probably nearly all the cultivars of *C. florida* come from the wild, where unusual trees or branches of trees have been noticed by sharp-eyed people who took propagating wood from them. Perhaps a few, especially pinks and reds, are selections made in nurseries. We have a tree called 'Boyd's

Willowleaf' which originated in Tennessee, but there is a tree with the same narrow foliage that grew naturally just a few miles from the Arboretum. Just a small twig with double flowers or curious foliage can give rise to a new cultivar. These trees must all be propagated, of course, asexually. The seed would seldom reproduce plants like the parent.

The recent ridiculous "legend" connecting this woodland nymph with the Crucifixion is a fantasy that I doubt can be traced back any earlier than the 1940's. I hate to see the lovely truth of the flowering dogwood twisted into representing a tool of punishment by this unpleasant fabrication.

The flowering dogwood is a native only of the eastern half of the United States. The recent ridiculous "legend" connecting this woodland nymph with the Crucifixion is a fantasy that I doubt can be traced back any earlier than the 1940's. I hate to see the lovely truth of the flowering dogwood twisted into representing a tool of punishment by this unpleasant fabrication.

There are at Tyler two other species of dogwood with conspicuous bracts, *C. nuttalli* and *C. kousa*. If you walk down the main drive past the greenhouse and the wooden shed and then turn left sharply toward the North Woods, you will see on your left a fine young tree about 20 ft. tall, the Pacific dogwood, *C. nuttalli*. It has been found that grafting this species on *C. florida* enables it to adapt to eastern growing conditions. In its native haunts it can reach 75 ft. and more, and the growth our tree is making indicates it will tower over the flowering dogwoods around it. Each flower cluster is surrounded by four to six bracts, usually five. The bracts are quite broad, but abruptly pointed. The winter bud cluster is much larger than that of the flowering dogwood, and

the buds of individual florets can be easily seen. The bracts are too small to enclose the rounded cluster completely, and cover only a small part of it. The Pacific dogwood blooms at the same time as the flowering dogwood.

Near our tree you will see the 'Boyd's Willowleaf' and a low, pudgy tree called 'Pygmy.' In the same area is an attractive double called 'Mary Ellen,' and a little farther away are two clones with variegated foliage, 'First Lady' and 'Rainbow.'

If you turn your back on the North Woods and walk beyond the shed to the steps that go down into the Old Arboretum, you will see on your left a fine specimen of *C. kousa*, a native of China, Korea and Japan. Its bracts are expanding as the fading bracts of the flowering dogwood are fluttering to the ground. There are four to a flower cluster, and they taper to points. The ball-shaped flower cluster develops into a compound fruit that looks a little like a strawberry hanging from a 2 in. stem. The autumn color of the *C. kousa* is good, developing later than that of the flowering dogwood. The bark peels off in patches, showing the pale inner bark. The winter buds are slender and pointed.

To the right of the path, across from the *C. kousa*, is a shrubby tree of the cornelian cherry, *C. officinalis*. Why that name? The usual common name of the genus *Cornus* in Great Britain is cornel, and this particular cornel has fruits like oblong cherries that can be used for preserves. It is an old and valued garden plant that blooms with the forsythia. The soft yellow flowers cover the plant before the leaves open. Each cluster is subtended by four brownish yellow bracts that had enclosed the winter bud, but these do not enlarge. The cornelian cherry is not so showy as the forsythia, but makes a tidy and an interesting specimen. Underplanted with small early bulbs it makes a charming picture. There are three plants near the entrance to the parking lot, one of which fruits unusually well. *C. officinalis* of Japan is almost a twin of the cornelian cherry; two plants are near the ponds.



Closeup of berries of *Cornus florida* (fall).



Winter buds, *Cornus florida*

The Painter brothers, who planted the first trees at Tyler, tried another dogwood with showy bracts. This was *C. capitata* of the Himalayas and China, said to be very beautiful, with pale yellow bracts and strawberry-like fruits. But, alas, it is far too tender here. It is interesting to note, however, that they were able to import this tree in 1857 when it had only been introduced to Europe, presumably from seed, in 1825. They tried it twice. They also grew *C. mas*, and the big old shrub up the hillside from the foot bridge over Rocky Run is probably one they planted.

They also grew the shrubby *C. sanguinea*, known in Britain as the common dogwood. Its powdered bark was used to treat dogs for mange.

We have near the ponds two patches of the shrubby, suckering red-osier dogwood (*C. stolonifera*), and on the far side of the ponds may be found its variety, the yellow-stemmed *C. s.*

flaviramea. Both are most effective if cut to the ground every few years to encourage the growth of young, brightly-colored stems. In the North Woods is a large shrub of the silky dogwood (*C. amomum*).

These shrubs are too large and coarse for the average garden. They come into their own in colder climates, where their hardy bare branches add color, especially against snow, in winter. The clusters of whitish flowers are not very showy, and birds soon eat the white or bluish fruits. They are natives of this area.

Also native is the pagoda dogwood (*C. alternifolia*) which differs in being alternate instead of opposite leaved. A good specimen is very pretty in bloom, with the horizontal branches in whorled tiers holding up the flat clusters of white flowers. There are one or two small ones on the snowdrop bank; several larger ones died from the attack of a small gall-forming fly.

The common dogwood of Europe, mentioned above, is not the only useful one. Our own flowering dogwood supplies a substance from its inner bark akin to quinine, used by the Indians for fighting fevers. The roots have supplied a red dye. The smooth, hard wood is valued for making the heads of golf clubs and for the wooden parts of small tools. The textile industry has used it extensively for shuttles. Fortunately the trees with many lower branches are too knotty for commercial use, but there has been a heavy toll of the tall, straight trees of virgin forests.

The flowering dogwood will always have an honored place in our gardens. The kousa dogwood should be more widely planted, as its bloom comes after that of most of the small flowering trees is over.

But perhaps we shall always love the white drifts of bloom the most in a wild setting. Come wander among the trees at Tyler. Admire the tamer kinds, the pinks, doubles, and so forth; then walk out into the woods and up to the higher ground where the flowering dogwoods go their own way to delight us.



by Gertrude S. Wister

lilacs by the tree-full



Syringa amurensis

The common lilac has been a doorway friend since earliest times, and is often a vestige of some of the oldest homesites in America. Varieties and hybrids of lilac now number in the hundreds. Old or new, plain or fancy, sweet lilac reminds us of the warming days of May.

But June has its lilacs, too. Among the late-bloomers are the "tree lilacs," members of the *Syringa* genus whose habit is that of a small tree. The Amur, the Peking, and the Japanese tree lilac are all part of the Morris Arboretum's collection. All originated in eastern Asia. All have cascades of white flowers, lush foliage, and a handsome bark, attributes that make them unique objects on the June landscape.

Clustered on the south bank of the stream that flows by the Cherry Walk are four mature tree-form lilacs. Three of the stand are Amur lilacs (*Syringa amurensis*). One is the Japanese lilac (*Syringa amurensis* var. *japonica*). All

are approximately 20 ft. tall with spreading, rounded crowns. Two have double trunks; two are single. The outward reaching branches create an intimate space beside the small stream.

The bark of the tree lilac much resembles that of the cherry: on principal branches it is grey and lustrous, on young stems a shiny bronze. Faint circumscriptions and nubby outgrowths pattern the bark throughout.

Foliage of the Japanese and Amur lilac is large and creates a coarse textural appearance. The smooth, oval, pointed leaves are dark green above, greyish-green beneath and provide a perfect foil for the cloud-like flower clusters that appear during the first weeks of June.

The Peking lilac (*Syringa pekinensis*) is best represented by the small tree situated north of the Azalea Meadow. There it dominates an island of Cumberland azaleas, whose fiery late-June flowers compliment the white profusion of the Peking lilac. Three main trunks, one of which measures almost a foot in diameter, rise in

an undulating pattern to a rounded crown some 20 ft. tall and almost as broad. The Peking lilac differs from the Amur and Japanese in its generally lighter, more delicate appearance. Branches of the Peking are more slender, its flower clusters not as large, its oval leaves an inch or two shorter than those of its oriental cousins. And somewhat more temperamental than its relatives, the Peking lilac does not begin prolific bloom until 10 to 12 ft. tall.

The drooping character of some tree lilacs early led researchers to type *Syringa pekinensis* the "weeping lilac." In time the term proved something of an overstatement. But the horizontal tendency of branch tips and flower clusters, complimented by the pendulous leaves, gives this tree lilac a gentle, restful appearance.

All lilacs are natives of the eastern hemisphere. The common lilac, *Syringa vulgaris*, and the lesser known, *Syringa josikaea*, originate in Bulgaria and Persia respectively, and their ranges travel eastward through the Caucasus Mountains into western Asia. The 23 remaining species of the *Syringa* genus are native to eastern Asia with 18 of the number found within China's borders.

Syringa pekinensis is native to the hills surrounding Peking, and the western world credits Porphyri Kirilov with its discovery. Kirilov was a medical doctor from St. Petersburg who also had a strong interest in botany. An 1830 Russian diplomatic team sent to Peking included Kirilov in its number. (A fellow-traveler was Alexander Von Bunge, for whom *Pinus bungeana* is named. See *Green Scene*, Nov.-Dec., 1974.) The party traveled through Mongolia to northern China, and Kirilov collected all the way. Upon his return to St. Petersburg in 1841, Kirilov published the results of his observations; *Syringa pekinensis* was among the plants the doctor reported in the Peking area.

Syringa amurensis is native to the



MORRIS ARBORETUM

9414 Meadowbrook Ave. • Phila. • PA 19118
Ch 7 5777

Amur River region of northeastern Asia. In the mid-eighteen hundreds, the Russians opened the Amur and Ussuri Rivers to navigation. Scientific teams followed to record, among other things, the flora of this remote territory. Botanist Richard Maack, a member of the exploratory team, sighted *Syringa amurensis* among the native trees and shrubs, and his observations were published in St. Petersburg in 1857.

Father Pierre D'Incarville, however, was probably the first to send news of the eastern Asiatic tree lilac to Europe, though for over a century his discovery went unnoticed. A Jesuit missionary, Father D'Incarville lived in China from 1740 to 1756. The seeds he forwarded to his mentor, Bernard de Jussieu, in Paris were responsible for the introduction of many new plants to European gardens. But his dried plant collection, which included a specimen of *Syringa amurensis*, did not fare as well. It lay undisturbed and, for the most part, forgotten until 1882, more than a century later. By the time its contents were finally determined,

Syringa amurensis had already been credited to Richard Maack, and so the record stands today.

The only lilac native to Japan is *Syringa amurensis* var. *japonica*, a geographic variant of the Amur lilac. The Japanese tree lilac grows in profusion in the moist native forests of north-central Japan and its range continues into the island of Hokkaido. The Ainu, a tribal people of Hokkaido, revere its wood and look upon wands of the Japanese lilac as guardians against harm from nature, disease and evil spirits.

Tree forms of lilac differ from shrub forms in flower structure as well as in habit. The flowers of the lilac tree are white, 1/8 in. in diameter, have a shorter corolla tube than shrub forms, and protruded stamens. Florets are gathered in many branched clusters from 4 in. to 9 in. in diameter, depending upon the species.

Early blooming lilacs have the sweet fragrance we love to carry into our homes. Among lilacs, however, the rule seems to prevail: the later the bloom, the heavier the scent. Tree

lilacs virtually close the lilac season, and their scent is close to that of privet.

As a very hardy, small tree of graceful habit and seasonally dramatic appearance, the tree lilac should be an inviting item for the home landscape gardener. The tree must have ample sun, air, and elbow room. It likes a sweet soil (that is, one rich in lime), and a look-out should be kept for stem boring insects. Other than these minor considerations, the tree lilac does well with little attention. Besides its abundant floral displays June after June, the tree lilac retains its foliage until late in the fall, and the glossy bark provides winter interest.

The tree lilac's limited growth potential and resistance to air pollution and salt damage recommend it for greater urban use. When trained to a standard it can be used as a street tree and, unlike some ornamental flowering trees, will not produce a great volume of litter. Plebian in its requirements but aristocratic in display, the tree lilac could do much to lighten garden and town.



by Susan B. Blum

classified ads

LORD AND BURNHAM GREENHOUSES for the care, cultivation and protection of tender growing plants; painstakingly custom designed to your specific horticultural needs, flawlessly erected, and delivered on time every time. Inquiry welcome. QED, INC., Villanova, PA. 688-4825.

Hundreds of satisfied green tenants... From the plant people who build greenhouses... Not builders who are green about plants.

MAIN LINE GREENHOUSE SERVICE. Complete and professional care by week, month or year. Includes individual plants for travelers. Barnes Foundation graduate. Member of Pa. Horticultural Society, Orchid Societies and Begonia Society. Reasonable. LA 5-8098.

Specialists in Japanese, City, Naturalistic gardens, featuring volcanic rock, ornamental pools, waterfalls, terraces. Plantings designed by Landscape Architectural Service Department, installed by expert landscapers. J. Franklin Styer Nurseries, Inc., Concordville, PA 19331. Telephone GL 9-2400.

Going away? Responsible couple (Franklin and Marshall graduate, sophomore medical student; Agnes Irwin alumna, attended Hohns College) will care for your home, plants, greenhouse, garden, pets. Children-sitting also available; references. Further information: (215) 446-3111.

A plant nursery with over 5,000 different representations of the unusual in Rhododendron, Azaleas, Dwarf Conifers, Bamboos, Exotic Japanese Maples, Ornamental Grasses, Iris, Hostas, Peonies, Sempervivums, Alpines and perennials. Come to **PALETTE GARDENS** halfway between Quakertown and Coopersburg on Route 309. Mail order catalog available for 50¢. Landscape designer services available. Open 7 days a week. 26 W. Zion Hill Road, Quakertown, PA 18951.

WHOLESALE: Red Anthuriums - \$4.00 (other varieties on request), Woodrose blossoms \$27.30 a gross. Other exotica also available. Call 752-1062 or write M & M Enterprises, 277 Playwickey Street, Langhorne, PA 19047.

Advertising copy should be submitted 8 weeks before issue date: November, January, March, May, July, September. Minimum rate \$5.50 (covers up to 35 words). Additional words 20¢ each. Less 10% discount for two or more consecutive issues, using same copy. All copy should be accompanied by check made out to PENNSYLVANIA HORTICULTURAL SOCIETY and sent to Patricia M. Cain, THE GREEN SCENE, 325 Walnut Street, Philadelphia, PA 19106.



Iris cristata and Eastern
columbine at Bowman's Hill
Wildflower Preserve.
See page 24.



in this issue:

ALL ABOUT SOILS

THE
**green
scene**

HORTICULTURE IN THE DELAWARE VALLEY

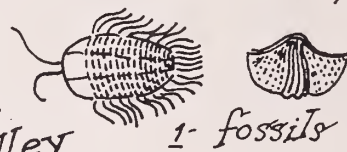
JULY • AUGUST • 1975

\$1.00

Appalachian Plateau

Delaware Water Gap

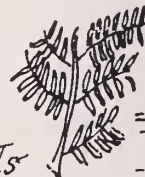
Ridge Valley Province



1- fossils

Easton

Hunterdon Cty



2- fossils

Piedmont

Plateau

Fall Line

Buckingham Mt.

Bucks Cty

Bowman's Hill

Yardley

Trenton

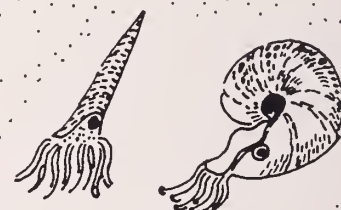
Valley Forge

Philadelphia

Wilmington

Delaware River

Coastal Plain



3- fossils

Paleozoic Era

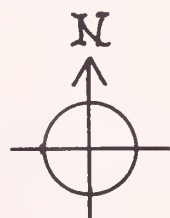
1- Cambrian Age - 500 million yrs. ago

Ordovician Age - 400 million yrs. ago

Mesozoic Era

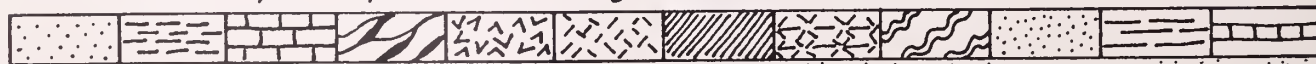
2- Triassic Age - 200 million yrs. ago

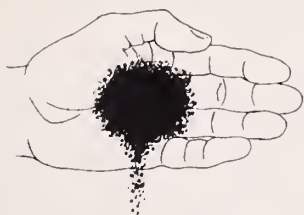
3- Cretaceous Age - 100 million yrs. ago



Delaware Valley Geology


sandstone shale limestone iron strata diabase granite serpentinite mica gneiss sand clay marl





SOIL: in the beginning

DELAWARE VALLEY GEOLOGY

 by Edgar T. Wherry

The Delaware River rises in the Appalachian Plateau, enters the Ridge-Valley Province at the Water Gap and the Piedmont at Easton; at Trenton it crosses the Fall Line into the Coastal Plain. The rocks that emerged along its shores in the Ridge-Valley Province are sandstones, schists and limestones. The enclosed fossil shells show these rocks to be of Cambrian and Ordovician ages, deposited in shallow seas, which covered eastern North America. Then in the middle of the Paleozoic Era the uplift of the land ended sediment deposits here.

At the start of the Mesozoic Era a long narrow depression developed, extending from the present Nova Scotia southeastward. The depression crossed the Delaware Valley region in Hunterdon County, New Jersey, and Bucks County, Pennsylvania, and continued to North Carolina. Streams flowing down from the bordering uplands deposited vast amounts of sandy and muddy sediments in the depression. In time the deposits hardened into sandstone and shale rocks. Warm, dry climates favored the complete oxidation of iron compounds, causing many of the strata to become deep red. Locally, however, lakes developed and organic matter accumulated, rendering the sediments in the lakes brown, and even black. These dark beds contain fossils, notably crustaceans, fish and reptiles along with the remains of the plants on which they fed, chiefly ferns and cycads. Tree trunks, ancestors of modern araucarias, were washed into local sandy marshes and are now found as chunks of petrified wood. These Triassic strata outcrop along the river from Milford almost to Trenton, New Jersey.

Interruptions in the continuous

expanse of red strata occur. East of Doylestown, Pa., a fault has brought up a strip of Cambrian sandstone, forming Buckingham Mountain, along with limestone underlying the valley at its north base. Molten magma intruded the sedimentary beds and solidified into the gray crystalline igneous rock known technically as diabase and colloquially as trap-rock. Resistant to weathering, these rocks may form small "mountains" and hills, the most notable being Bowman's Hill, south of New Hope.

The Triassic rocks underlay the greater part of the Piedmont Physiographic Province; however, between a line running from Yardley to Valley Forge, Pennsylvania, and the Fall Line, there outcrop formations more ancient than those discussed; for simplicity's sake I will refer to them as pre-Cambrian. These include granite and other igneous rocks, the Wissahickon mica-gneiss derived from sand-clay sediments, the Baltimore gneiss from silica-rich igneous rocks, and serpentine from base-rich ones. The most peculiar soils and vegetation of the region develop on this last rock type.

Late in the Mesozoic Era the land sank sufficiently to enable the ocean to form southeast of the Fall Line shallow bays. Here were deposited sands, clays and greensand-marl, shown by included fossil shells to be of Cretaceous age. These together with overlying similar deposits of Tertiary age have never become hardened into rocks, and so underlie relatively flat land extending to the ocean shore, appropriately termed the Coastal Plain. After following a generally southeastward course through the Piedmont, the Delaware River abruptly turns and flows southwestward just below the Fall Line until it reaches the

bay near Wilmington. The relatively hard rocks of the Fall Line outcrop in the beds of the various creeks tributary to the River, and are encountered in excavations during building operations in lower Philadelphia and adjacent Pennsylvania towns, but in New Jersey are only reached in deep wells.

When in the course of earth movements rocks are lifted above sea level, they are subject to weathering. Repeated freezing and thawing break their grains apart, and the solvent action of rainwater, saturated with atmospheric gases, gradually decomposes most of their constituent minerals. Insoluble quartz grains and clay particles accumulate, along with red and yellow iron oxides which result in coloration, as may also humus matter from the decay of plant debris. The soluble compounds of such elements as calcium and potassium are drained away from the surface, but may accumulate at moderate depths. Thus are formed the soils discussed in the following articles.

Edgar T. Wherry received his Ph.D. in Mineralogy from the University of Pennsylvania in 1909. Since then he has been a researcher and teacher in the geological field. Becoming interested in the relationship of plants to their underlying soils, Wherry was employed by the U.S. Department of Agriculture where he collaborated with Dr. Frederick V. Coville in research on the domestication of the blueberry, which has been so successful in southern New Jersey. In the 1940's he founded the *Bulletin of the American Rock Garden Society*. Now retired from teaching botany and ecology at the University of Pennsylvania, he is actively engaged in study of the distribution of native plants in Pennsylvania.



THE green scene

HORTICULTURE IN THE DELAWARE VALLEY

Volume 3, Number 6 July, August 1975

published by
THE PENNSYLVANIA
HORTICULTURAL SOCIETY
325 Walnut Street, Philadelphia, Pa. 19106

Ernesta D. Ballard/*President*
Jean Byrne/*Editor*

PUBLICATIONS COMMITTEE

Craig S. Oliver/*Chairman*
George M. Harding
Nancy Howard
Robert S. Ryan
J. Franklin Styer
Dorothy Young

Patricia M. Cain/*Classified Advertising*
/Retail Distribution

Designer

Julie Baxendell
Baxendell Design Associates

THE GREEN SCENE, Volume 3, No. 6, published bimonthly, January, March, May, July, September, November, by the Pennsylvania Horticultural Society, a non-profit membership organization at 325 Walnut Street, Philadelphia, Pa. 19106. Subscription: \$5.00 — Single Copy: \$1.00. Second class postage paid at Philadelphia, Pa. 19104.

POSTMASTER: Send Form No. 3579 to THE GREEN SCENE, 325 Walnut Street, Philadelphia, Pa. 19106.

© Pennsylvania Horticultural Society, 1975

CORRECTION

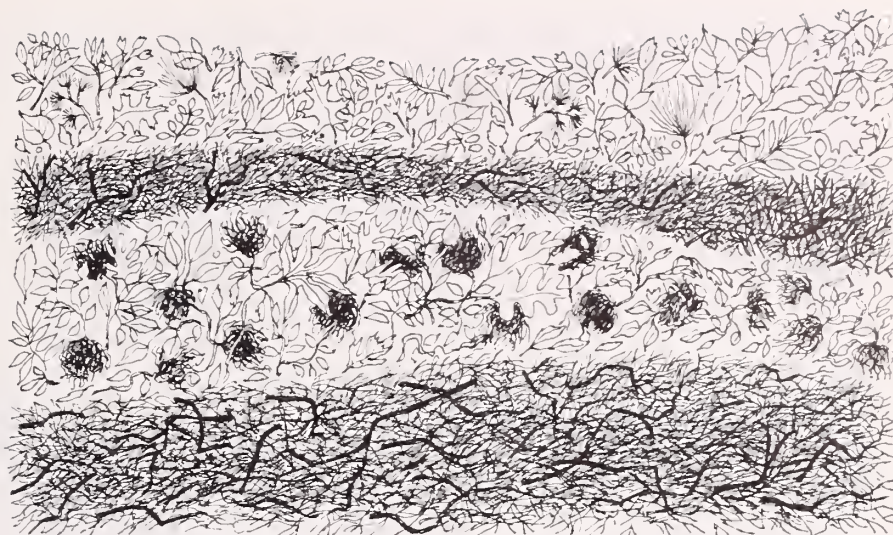
Dr. Edgar T. Wherry, who has made a detailed study of trilliums, calls attention to an unfortunate error on page 25 of the May/June issue of *Green Scene* (Bowman's Hill story). The photograph is captioned Toad trillium (*Trillium luteum*). Dr. Wherry points out that toad trillium is not *T. luteum* but *T. sessile*; further, he points out that the photo is neither of these but the mottled yellow trillium, *T. discolor*. Being a native of North Carolina, it does not belong at Bowman's Hill, which is dedicated to natives of Pennsylvania.

in this issue


- 1 Soil: Delaware Valley Geology by *Edgar T. Wherry*
- 3 The Compost Heap by *Ernesta D. Ballard*
- 6 The Good Earth by *Roy L. Flannery*
- 12 Soils of the Pine Barrens by *Carol Sclafani*
- 14 Soil: Questions and Answers by *Ed Lindemann*
- 16 Try Soil Testing by *W. Wayne Hinish*
- 17 Your Extension Service
- 18 A Productive Fallow . . . Green Manure by *John Gyer*
- 19 Gardening on Rescued Soils by *Gary Koller*
- 22 Growing Plants Without Soil by *Hans A. Zutter*
- 26 Humus from the Dump by *Edythe Collins*
- 28 The Morris Arboretum: The Soils of the Morris Arboretum by *Gordon A. Brandes*
- 30 The Tyler Arboretum: Soils and Springs of The John J. Tyler Arboretum by *Gertrude S. Wister*
- 32 Classified Advertising
- Inside back cover Index
- Front Cover: Well-rotted compost is shredded for use in potting mixtures, seed beds, mulches and soil conditioners. The shredding mixes the compost and removes rocks and undecayed lumps of debris. See story page 3.
- Back Cover: Schist from Ordovician age (400 million years ago) is exposed in an unused quarry on the west side of Stenton Avenue about two miles northwest of Northwestern Avenue, Philadelphia.

The fresh rock is gray, but exposure to the weather has freed iron oxide to produce a pinkish tint. The soil over such rock produced by centuries of weathering is a rather sterile clay-loam. See story page 1.

Front and back cover photos by Edmund B. Gilchrist, Jr.



the compost heap

 by Ernesta D. Ballard

One of the features of our garden that attracts attention is the compost heap. I am continually surprised at the number of visitors who notice it, inspect it, and finally ask cautious questions about it—all with a reticence befitting a person inquiring about another's religion. The management of a compost heap is viewed by many as a time-consuming mystery practiced only by the gardening elite.

Nothing could be further from the truth. The management of my compost heap is anything but time-consuming. My use of compost has its origins, not in some arcane horticultural theory, but rather as a response to two practical problems: one, what to do with grass cuttings, plant trimmings and other garden debris; two, how to obtain a good supply of potting and garden soil without spending a fortune on peat moss or packaged mulch. The answer, of course, is to transmute the garden trash into soil conditioner and growing medium. The mechanism that accomplishes this bit of alchemy is the compost heap.

What do I put on my heap? All herbaceous waste generated by my indoor plants and my garden, clippings, trim-

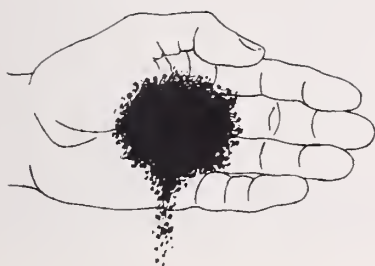
mings, sometimes entire potted plants, rootball and all. The only exception I make is our tremendous supply of leaves, which we pile in a separate heap. Leaves take considerably longer to break down than the other material.

We don't put garbage on the heap for the simple reason that to do so adds considerable trouble and produces relatively little additional compost. Perhaps if we had less garden trash and more time to take precautions against vermin, we would throw in the garbage, too.

How do we build the heap? In the simplest possible way. The foundation lines are laid out on a relatively flat space four or five feet square. As trash accumulates, we build walls of the composting trash along these lines, keeping the outside as nearly vertical as possible. We fill the interior space with more trash, but always keep it lower than the walls, so that the upper surface is markedly concave. This procedure accomplishes two results. It funnels rain into the center of the heap. And it insures that each handful or forkful of trash added to the walls will slant toward the inside rather than the outside of the heap.

Do we add anything to the compost

continued





4

as we build the heap? The answer is, no, in the sense that we do not regularly sprinkle the heap with phosphate or potash, as many authorities recommend. I find it easier to add these when I make up my potting mixture, or as part of my garden fertilizer routine. Nor do we periodically incorporate a layer of soil—another often recommended practice. The purpose of add-

ing soil is to be sure that there are enough soil bacteria to decompose the vegetable matter. In our case the up-rooted garden weeds have proved to carry plenty of soil attached to their roots.

What about management of the heap? How often do we turn it? The answer is, never. The principal purpose of turning a compost pile is to speed

decomposition by aerating the mass, thus encouraging the growth of air-breathing soil organisms. Also, it produces a more homogeneous mixture.

There is no doubt that turning the heap is beneficial if you are in a hurry. If you turn it two or three times in the summer and water it frequently, you can often achieve complete decomposition in a single year. But is it worth



One inch mesh screening
for compost heap.

ment with a good supply of air at temperatures above 70°. Hence the emphasis in the texts on water, aeration, and heat. When compost is added to a garden bed, it acts primarily as a soil conditioner. The partially decayed, fibrous portions retain water and nutrient solvents like a wet sponge. The fully-decayed portion (called humus) gathers the tiny grains of sand or clay into clusters held together by minute electrical forces. The spaces between the clusters make the soil more permeable to water and air, thus improving what the garden books call its tilth.

More up-to-date writers—with whom I agree—say that the nutritive value of compost is so small as to be virtually negligible.

As to whether compost is also a source of plant nutrients, that is a question each gardener will have to decide for his or her own self. The old texts, written before the advent of modern chemical fertilizers, tend to emphasize the nutrient value of compost. More up-to-date writers—with whom I agree—say that the nutritive value of compost is so small as to be virtually negligible. They advise us to view compost primarily as a means of improving the physical structure of the soil and to rely on fertilizers to improve the chemical content. But all good gardeners, now and in the past, are unanimous in saying that adding compost to the soil makes plants grow better — much better.

One final word about handling compost when it is well decayed and ready to apply. If you are going to

incorporate the compost into a garden bed, you can sometimes use it just as it comes from the heap. Scatter it over the bed three or four inches deep, and either fork it into the soil or let it lie on the surface like a mulch.

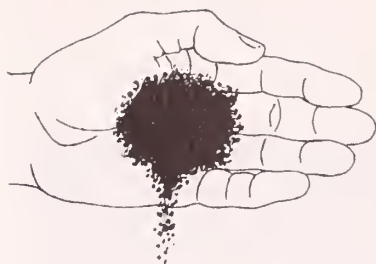
On the other hand, if you are going to use the compost in a potting mixture or seed bed, you will probably want to put it through a sieve to break down lumps and clods and separate out any undecayed woody material. For small amounts, we find that a metal screen with a one-inch mesh (sometimes hard to find) works admirably. Smaller meshes tend to clog up. If you need larger quantities than you can conveniently put through a screen, I suggest you invest in a mechanical shredder, like the one shown on the cover of this issue. They come with either electric or gasoline motors and in a short time will process all the compost you can produce with comparatively little effort on your part. The thing to remember is that dry material goes through the shredder easily; wet material clogs the shredder just as it clogs a screen. Choose a dry spell at the end of summer to shred your compost, and spread it out a bit before you do so.

The important thing to keep always in mind is that composting is not an end in itself. It is only a means to the two ends of trash disposal and soil improvement. The emphasis should be on making the operation simple. Don't do anything more than is necessary to get satisfactory results. If you approach it this way, I am confident you will find it worthwhile.

Ernesta D. Ballard is president of the Pennsylvania Horticultural Society. She and her husband garden on an acre in the Delaware Valley.

the effort? We find it easier to build two heaps and let each stand for two years without any special treatment. The resulting compost is just as good.

Incidentally, just what is the function of compost? Why is it so highly prized by gardeners? Compost is decaying organic matter formed by the action of soil bacteria, which operate most effectively in a moist environ-



the Good Earth

the

Soils are generally made up of three layers: (1) topsoil, (2) subsoil, and (3) parent material. The topsoil layer is usually the most suitable for plant growth, because it generally contains the most organic matter, has the best texture and structure, has the highest water holding capacity, contains the greatest quantity of plant foods and is often less acid than the subsoil layer.

Soils in the Delaware Valley vary widely in their physical and chemical composition and in their ability to grow plants. Some soils in this area need improved drainage, most need organic matter additions and essentially all need lime and fertilizer (organic and/or inorganic) to either make or keep them in a suitable condition for the growth of desirable plants.

Soils in the Delaware Valley vary widely in textural class (content of sand, silt and clay) from sand to clay loam. Sandy or coarse textured soils usually have good to excessive drainage, good aeration, but often have low organic matter contents and water holding capacities. These soils warm up quicker, dry out faster and can usually be worked earlier in the spring than fine textured soils (loams, silt loams and clay loams). The sandier type soils need more frequent applications of water, organic matter, and lime and fertilizer materials than fine textured soils for best plant growth.

Fine textured soils that are high in

clay content and low in organic matter are often poorly drained, very hard and compact, are very difficult to work and not well suited for the growth of many plants. These soils can often be improved by improving the surface and/or subsoil drainage, by adding organic matter and often lime and fertilizer materials.

The best soils for plant growth are sandy loams, loams, and silt loams in texture, are well drained (uniform brown or reddish brown in color), are well supplied with organic matter and have a granular structure. These soils can be made suitable for the growth of practically all plants when supplied with the proper kinds and quantities of lime and fertilizer materials.

liming materials and their uses

Lime is applied to acid soils primarily for three purposes: (1) to supply calcium and sometimes magnesium for plant growth, (2) to reduce the toxicity of aluminum, manganese, and iron for plant growth, and (3) to increase the pH of acid soils and thereby make other plant nutrients more available.

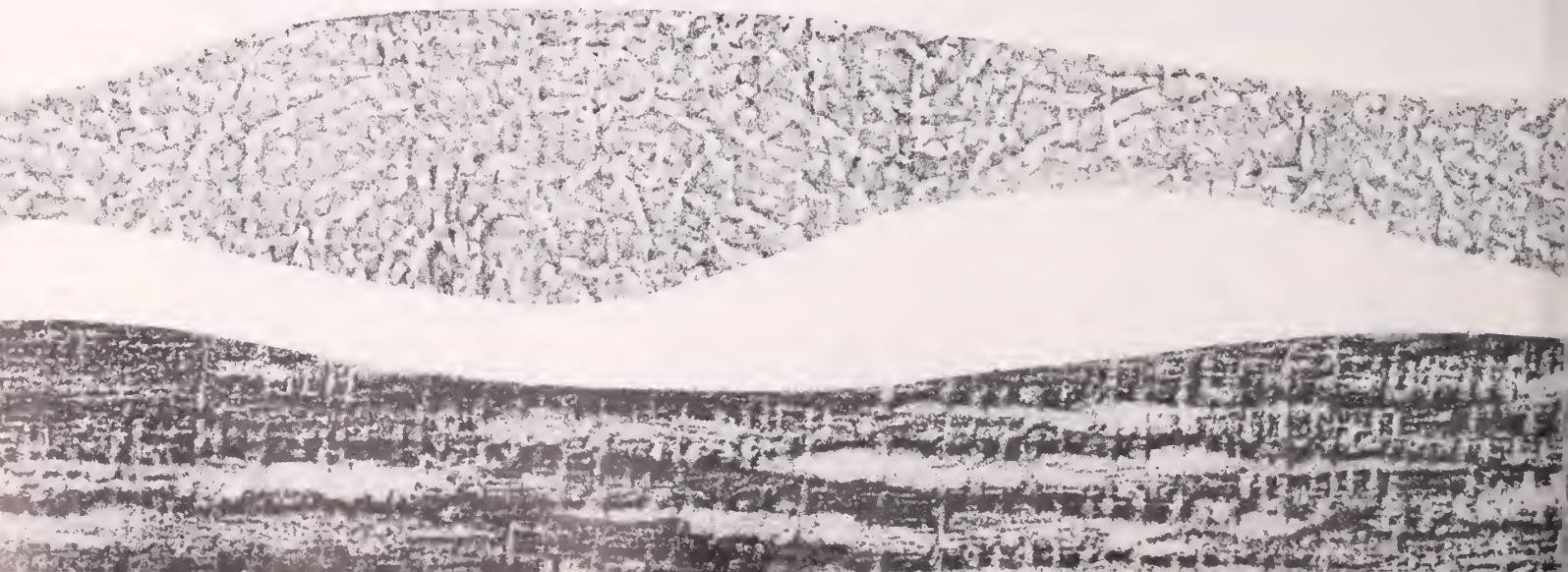
Why Soils are Acid. The main reasons soils are acid may be summarized as follows: (1) some soils have developed from parent materials that are acid, (2) rain leaches lime downward, carrying some of it out of the reach of plant roots, (3) plant roots secrete

hydrogen ions, which make soils more acid, (4) most nitrogen fertilizers are acid and, therefore, make the soil more acid after application and (5) sulfur is an ingredient of some fungicides and its use creates acid conditions.

Liming Materials. The most common agricultural liming materials that are available for general use are: (1) **calcitic limestone** (CaCO_3) which is pulverized, ground or granular in particle size, (2) **dolomitic limestone** ($\text{CaMg}(\text{CO}_3)_2$) which is pulverized, ground or granular limestone that is high in magnesium content, (3) **burnt lime** (CaO), which is a burned form of limestone, and (4) **hydrated lime** ($\text{Ca}(\text{OH})_2$), made from burnt lime through the addition of moisture.

All of the liming materials mentioned supply calcium or calcium and magnesium, raise the pH, and make aluminum, manganese, and iron less toxic. The choice of which one to use is determined by the cost in relation to its purity (total oxide content), the ease of handling, and the speed with which the liming material reacts with the soil. An average limestone material contains approximately 50% total oxides ($\text{CaO} + \text{MgO}$), a hydrated lime 70% total oxides and a burnt lime 90% total oxides. Pulverized limestones are generally best suited for home garden use.

The higher the total oxide percentage of the liming material, the more acids it can neutralize. The finer the



author discusses ways of treating soils for better growth

lime particles, the faster they react with the soil to neutralize soil acids and become available to the plant.

Lime Requirement of Soils and Crops. Several factors should be considered in deciding how much liming material should be applied under a specific set of soil and plant conditions. Some of these factors are: (1) pH requirement of plant to be grown, (2) existing pH of the soil, (3) texture

soils as far in advance of making new plantings as possible. Small applications of liming materials may be made annually or larger amounts may be applied every two, three or four years to maintain soil pH.

Overliming. Overliming injures plants, particularly acid loving plants, by creating an iron, manganese, zinc or boron deficiency or a combination of these deficiencies.

elements are currently known to be essential as raw materials for the growth and reproduction of higher plants. They may be separated into four groups as follows:

ELEMENTS ESSENTIAL FOR THE GROWTH AND REPRODUCTION OF HIGHER PLANTS

Group 1

1. Carbon (C)
2. Hydrogen (H)
3. Oxygen (O)

Group 2

4. Nitrogen (N)
5. Phosphorus (P)
6. Potassium (K)

Group 3

7. Calcium (Ca)
8. Magnesium (Mg)
9. Sulfur (S)

Group 4

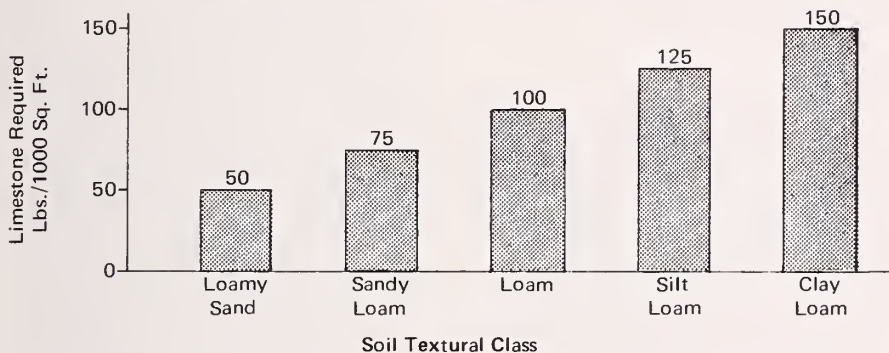
10. Boron (B)
11. Chlorine (Cl)
12. Copper (Cu)
13. Iron (Fe)
14. Manganese (Mn)
15. Molybdenum (Mo)
16. Zinc (Zn)

Plants obtain the nutrient elements in group 1 (C, H, O) from carbon dioxide gas in the air and from water. The nutrient elements in groups 2, 3 and 4 are normally obtained by plants from the soil. Supplemental amounts of these nutrients are often supplied to soils in fertilizer materials.

Nutrient elements in group 2 are supplied in guaranteed amounts in commercial fertilizer materials. Those in group 3 are contained in lime, superphosphate and various sulfate salts. Use of the proper amount and kind of lime, along with a fertilizer mixture containing normal superphosphate, will supply sufficient amounts of group 3 nutrient elements for most

continued

Approximate Amounts of Pulverized Limestone (50% Total Oxides) Required to Change Soils of Different Textural Classes One pH Unit



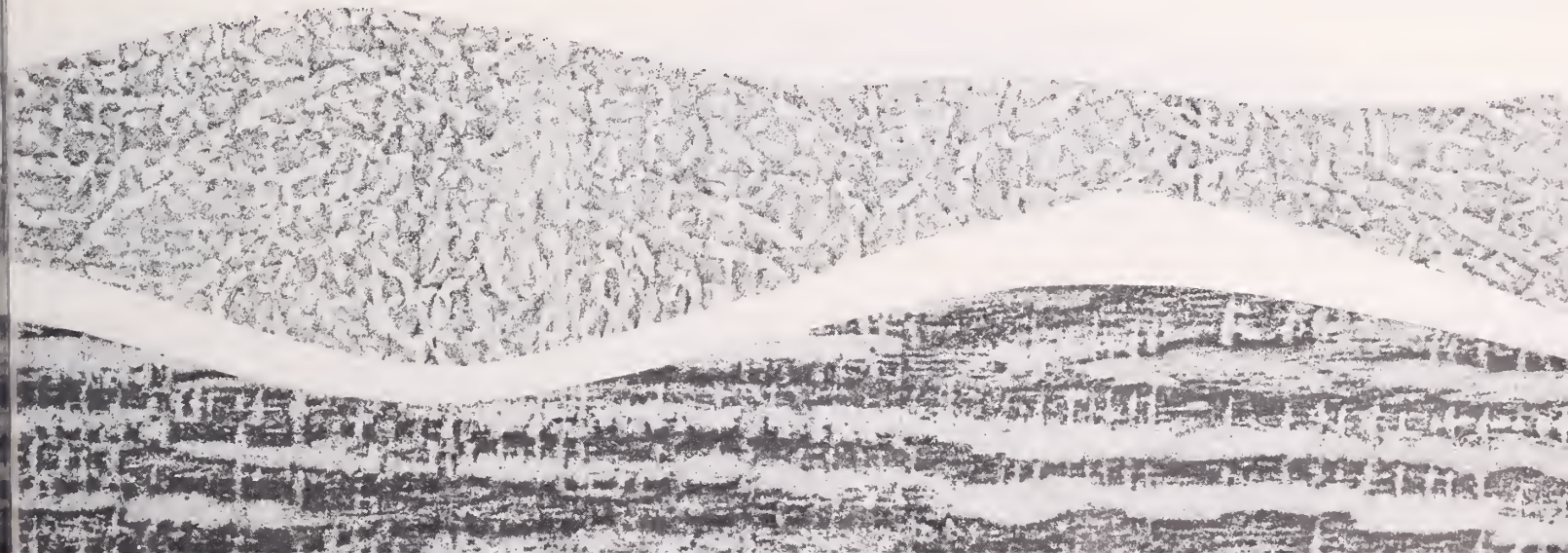
and organic matter content of the soil, (4) kind and purity of liming material to be used, and (5) fineness or particle size of liming material when limestone is to be used.

How to Apply Lime. Spread limestone uniformly and mix well with the top 6 to 12 in. of soil before making new seedlings or plantings. It is very important that liming materials be thoroughly mixed with strongly acid

Lime Loss. Lime is lost from soils by leaching, removed in plant harvests, by soil erosion, and by neutralization with acid forming fertilizers. This lime must be replaced in soils by maintenance applications to keep plants in a healthy state of growth.

plant nutrition

Plants contain small amounts of 90 or more elements. Only 16 of these



the Good Earth

plant needs. Where dolomitic lime, the most important source of magnesium, cannot be used, some other form of magnesium must be applied if the soil is deficient in this element.

The micronutrient elements in group 4, except for chlorine, are not generally contained in appreciable amounts in fertilizer mixtures. If soil is deficient in these elements, they should be applied in the form of soluble salts.

Most soils in the eastern United States are deficient in group 2 nutrients, nitrogen, phosphorus, and potassium. Most plants require an application of these nutrients if they are to grow well, and all three can be applied in the form of fertilizer.

Magnesium is the only nutrient in group 3 to be generally deficient in soils in this part of the country. For magnesium deficient soil, magnesium should be applied in the form of lime or combined into mix fertilizers.

Manganese, iron, boron and zinc are sometimes deficient in soils in this part of the country, particularly those soils that have been overlimed for best growth of some types of plants. Iron deficiency is commonly found in broadleaf evergreen plants growing in soils that have been overlimed.

fertilizer requirements

The need for fertilizer for home grounds' plantings depends largely upon the type of soil, its previous

treatment, the type of plant to be grown, the rate of growth desired and the location of the plant roots. Home owners must make periodic judgments regarding the nutritional status of their plants and the need for supplemental treatment. Soil analysis is one of the best tools to use in evaluating the fertility level of soils and their needs for lime and fertilizer materials. A wise plant grower will have his soil analyzed, evaluate the growth of his plants and follow information provided him from reliable sources in treating his plants. (See article on Soil Testing in this issue.)

fertilizers

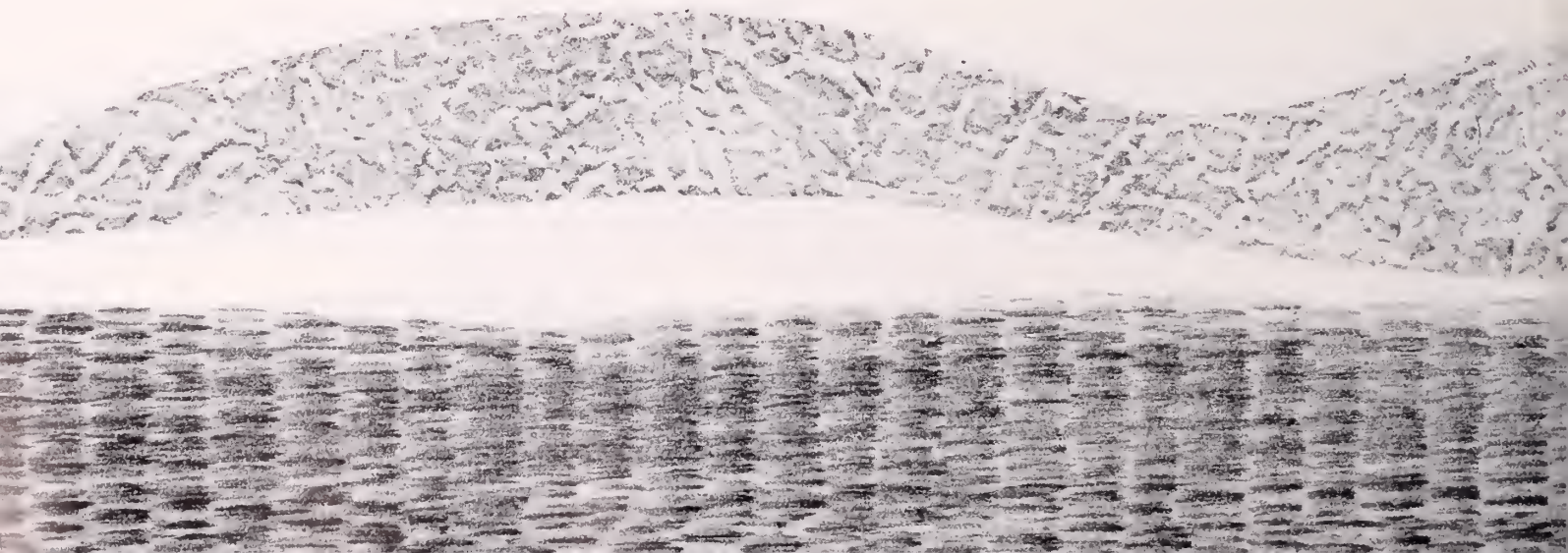
Fertilizers commonly used for fertilizing ornamental plants, lawns, vegetable gardens, flower beds, shrubs and trees are classified as either organic (natural) or inorganic (synthetic). Organics are derived from natural vegetative or animal sources. Inorganics are derived from minerals or chemicals and are usually referred to as chemical or fast-acting fertilizers.

Fertilizers are sold in both solid and liquid forms. A pound of solid fertilizer is equivalent to a pound of liquid fertilizer of the same analysis. Solid fertilizers are sold in the powdered, granulated and pelleted form. Liquids are sold as clear liquid, suspensions and slurries.

Processed tankage, activated sewage sludge, fish, cottonseed, soybean and

linseed meals, castor pomace and dehydrated animal manures are some of the most common sources of natural organic nitrogen fertilizer materials. These materials are generally low in nitrogen content, will last longer, and are easier to use (compared to inorganic nitrogen fertilizers). Ureaform or urea formaldehyde is a high grade synthetic-organic nitrogen fertilizer, containing approximately 38% nitrogen (N). It is now sold on the market under a variety of trade names. It is only slightly soluble, and is, therefore, a source of nitrogen slowly available to plants.

All mixed fertilizers or fertilizers that supply more than one plant nutrient are labeled with a three number analysis, e.g., 10-6-4 (N-P₂O₅-K₂O). These numbers mean, always in the same order, the percent nitrogen (N), phosphate (P₂O₅) and potash (K₂O). Therefore, a 10-6-4 fertilizer contains 10% nitrogen (N), 6% phosphate (P₂O₅) and 4% potash (K₂O). Inorganic fertilizers are often more widely used than organic types because they are more easily obtainable, cheaper per unit of nitrogen supplied, and contain a form of nitrogen that is more quickly available for plant use. The disadvantages of inorganic fertilizers are that they leach out of the soil more rapidly than organic types, are more liable to burn plant foliage and roots when improperly used and must be applied in smaller quantities, but



more frequently than organic types to supply a uniform nutrient supply for plant growth.

fertilizing specific types of plants

Deciduous Shrubs. Deciduous shrubs are those plants that shed their leaves each fall, such as privet, lilac, hydrangea, forsythia, spirea, weigelia, etc. The desired pH range for growing most plants in this group is 5.5 to 6.5. Maintenance fertilization of these plants typically consists of broadcasting a commercial fertilizer, such as a 10-10-10, 10-5-5 or 20-5-5 or similar grade, on the soil surface beneath the branches of the plant, starting a foot or so away from the main body of the plant and extending a foot or so beyond the branch spread. Apply fertilizer in early spring and rake into soil surface by light raking or watering. A normal application is 1½ to 3 lbs. of a 10% nitrogen or one-half this amount of a 20% nitrogen fertilizer per 100 sq. ft. of area. On very sandy soils or following heavy rains, a second application of fertilizer at approximately one-half the initial spring application may be advisable in late spring or early summer. Avoid fertilizing in late summer or early fall because it often stimulates new growth that may not harden off sufficiently to be winter hardy.

Deciduous Trees. The desired pH range for growing most deciduous trees is 5.5 to 6.5. Fertilize newly

planted shade trees in the same manner as suggested for deciduous shrubs. Fertilize older established trees, surrounded by turf, in late fall, winter or early spring, using the subsurface or punchbar method. Use a crowbar, pipe or soil auger or sampling tube to open holes from 1 to 2 ft. in depth,



depending upon the size of the tree and corresponding depth of the root system. Space these holes about 2 ft. apart, in concentric circles starting about 2 to 3 ft. from the tree trunk, and extending slightly beyond the outer edge of the branches. Divide the fertilizer needed according to the number of holes. Pour into the holes with a funnel to avoid spilling and burning the turf.

The most common recommended

rates for trees under 6 in. in diameter are 1 to 2 pounds of a 10-10-10, 10-5-5 or similar grade fertilizer per inch of trunk diameter measured one foot above the soil line. For larger trees 1½ to 2 times this amount is often recommended. Refill holes when fertilization is completed and water thoroughly unless soil is already wet.

Fertilize in the fall after the leaves have fallen, usually early November. Younger or rapidly growing trees should be fertilized annually. Older, more mature trees can be maintained in good vigor by fertilizing once every 2 to 3 years.

Narrow-leaved Evergreens. Included in this group of ornamental plants are arborvitae, juniper, taxus, hemlock, etc. This group of plants requires a well-drained and well-aerated soil, containing liberal amounts of organic matter. The most desired pH range for growing these plants is 5.5 to 6.5. These plants are easily damaged by overfertilizing at planting time. It is generally better to delay fertilizer applications until new plantings become established. Small amounts of limestone, superphosphate and a slowly soluble organic nitrogen fertilizer may be beneficial at planting time for very acid soils that are low in organic matter. On these types of soils add 2 to 3 in. of organic matter such as sphagnum peat moss, sedge or reed peat, rotted leaves or compost over the soil surface. After applying

continued

the Good Earth

the organic material, add 5 to 10 lbs. of pulverized limestone, 1 to 2 lbs. of superphosphate and 1 to 2 lbs. of a 50% organic 10-6-4 fertilizer or an equivalent amount of nitrogen in a fertilizer such as tankage, sewage sludge, cottonseed meal, etc., per 100 sq. ft. of soil area. All of these materials should then be thoroughly mixed with the top 6 to 12 inches of soil before new plantings are made.

For established plantings, apply a late fall, winter or spring application of a commercial fertilizer, such as a 20-5-5, 10-5-5 or 10-10-10 at the rate of 1 to 2 lbs. per 100 sq. ft. of area. Use the lower rate of the higher analysis fertilizers. Mix the fertilizer into the soil by shallow raking, followed by watering.

Narrow-leaved evergreens should not be overfertilized because some types have a tendency to become "stretched out" with excessive space between branches if too much fertilizer is used. Others that have dwarf characteristics need only enough fertilizer to maintain a good green color. Individual specimen evergreen trees should be fertilized in the same manner as recommended for deciduous trees.

Broad-leaved Evergreens. Broad-leaved evergreens include such plants as azalea, rhododendron, mountain laurel, andromeda, etc. This group of plants has essentially the same soil requirements as narrow-leaved types, with the additional need for a more

acid soil (pH 4.5 to 5.5) with a somewhat higher organic matter content. This need can be met by improving the planting area with acid type organic matter such as peat moss, peat-humus or rotted oak-leaf mold. Aluminum sulfate or sulfur may also be used to lower or make soils more acid where additions of acid organic materials do not work. Iron sulfate or iron chelates may also be used as a soil drench or foliar spray to correct iron deficiency which often develops in these plants when the soil is not acid enough. Mix a medium-to-coarse sand into heavier soils where necessary to improve soil drainage. Broad-leaved evergreens should not be planted in wet locations. Raised soil beds, which improve soil drainage, can sometimes be used to grow these plants in wet soils.

Since most broad-leaved evergreens have shallow root systems, a 2 to 3 inch layer of acid-type organic mulch will provide protection for them during hot, dry summers and excessive soil freezing during winter months. Mulch helps to conserve moisture, prevents excessive freezing, smothers newly germinated weed seeds and provides some plant nutrients. Sphagnum peat moss, oak leaf mold, wood chips and barks make good mulching materials for these plants.

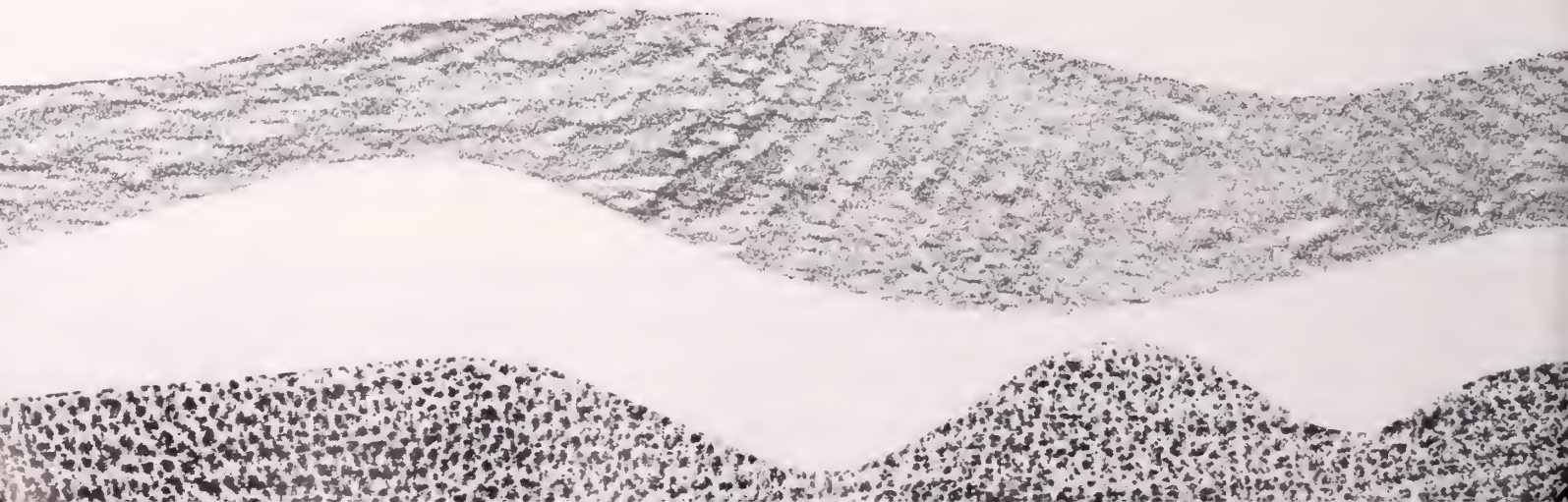
Soils that have been amply supplied with organic matter and kept well-mulched may contain a sufficient amount of nutrients for satisfactory

plant growth. When annual new growth appears stunted or is abnormal in color, some supplemental fertilizer is generally needed. Make a late fall, winter or early spring application of 1 to 2 lbs. of acid-forming fertilizer such as a 10-5-5 or 20-5-5 per 100 sq. ft. of area. Use the lower rate of the higher analysis fertilizers such as the 20-5-5. It is generally better to use a fertilizer containing a slowly soluble form of nitrogen for feeding these plants. A fertilizer having from 25 to 50% of its nitrogen in a water insoluble form is often preferred.

Lawns. Soils in the northeast, almost without exception, lack adequate quantities of nitrogen, phosphate or potash or a combination of these for good grass growth. Commercial fertilizers contain these nutrients and should be used to prevent lawn grasses from becoming yellow, thin, and weedy.

Fertilizers vary greatly in their composition. Some are safer or less likely to burn turf grasses than others; some contain greater or lesser amounts of water soluble and water insoluble nutrients, particularly nitrogen; and some flow more uniformly, which makes them easier to handle than others. Also, the types of fertilizers available in one area may differ from those for sale in other locations.

Nitrogen in lawn fertilizers may be in either a water soluble form (sometimes called inorganic or chemical) or in a water insoluble form (sometimes



called insoluble or organic), or as is most often the case a combination of the two forms. The soluble forms produce the most sudden and rapid growth, are less expensive per unit of nitrogen and require greater care in their use to prevent burning and overstimulation of the grass.

The insoluble forms of nitrogen are the most expensive per unit and will not burn the grass when properly used. They release their nitrogen more slowly and evenly and produce a uniform growth of grass over a longer period of time than the completely water soluble sources. Because of the greater safety and longer lasting effect of the water insoluble forms, it is a good and common practice in formulating lawn fertilizers to combine an insoluble form with a soluble one. Accordingly, it is desirable that fertilizers for maintaining established lawns contain approximately 50% of the nitrogen in the water insoluble form.

To establish lawns, and for lawns that are on very acid soils low in phosphorus, a high phosphorus fertilizer, such as a 5-10-5 or 10-20-10, is the most efficient. For established lawns that are on soils with better fertility, a high nitrogen fertilizer such as a 10-6-4 or 10-5-5 is an efficient type. For high fertility soils (high phosphorus and high potassium) a high nitrogen fertilizer such as a 20-5-5 or 23-7-7 is the most efficient. Soil tests will help determine the phosphorus and potassium needs of lawn soils. The

most common rate of nitrogen recommended in a single application is 1 lb. per 1000 sq. ft.; this is equivalent to 10 lbs. of a 10% nitrogen or 5 lbs. of a 20% nitrogen fertilizer.

The best time to fertilize lawns is just before or when conditions are most favorable for growth of turf grasses. That means an application in early spring and another in late summer or early fall will promote satisfactory growth for most lawns. For thin or weedy lawns a third application in mid-fall is often beneficial. Merion Kentucky and other improved varieties or strains of Kentucky bluegrass may need a fourth application of fertilizer during the year.

Fertilizer should be spread evenly to prevent grass from becoming scorched and to prevent the development of unsightly light and dark streaks. Fertilizer should be spread when the grass is dry. Immediate and thorough watering with a fine spray after application will lessen the danger of burning and hasten the fertilizer used by the grass.

Don't forget to lime acid soils for good growth of lawn grasses. See lime table for recommended amounts of limestone needed to raise soil pH one unit. Lawn soils should be limed to a pH of 6.0 to 6.5.

Professor Flannery is in the Soils and Crops Department of Cook College, Rutgers University, New Brunswick, New Jersey.

Why All Soils Are Not Alike



by R. B. Alderfer

As everyone knows, soils are not all alike. The most important factors influencing the kind of soil found at a specific place are:

1. The nature of the parent materials (level of soil below topsoil and subsoil). The parent material is formed from the different geologic materials in that particular area. The parent materials are exposed and subjected to different physical and chemical weathering determining the kind of soil that is formed.

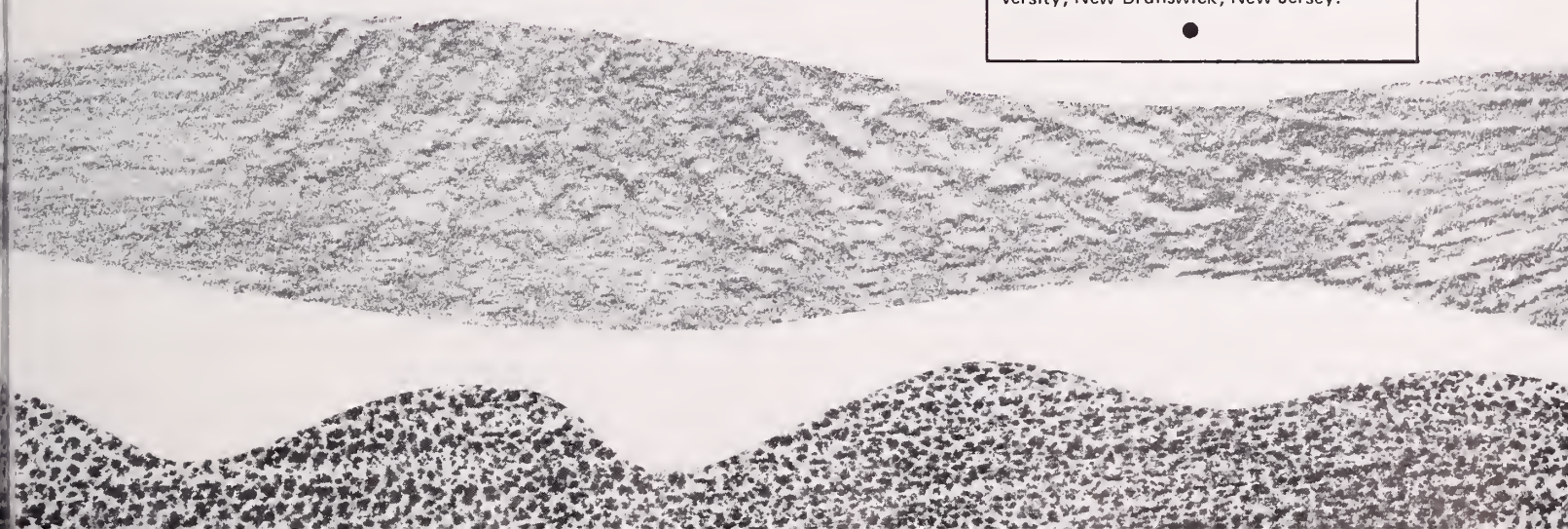
2. The environmental conditions under which the soil formed at a particular place including:

- climate, particularly the amount and seasonal distribution of precipitation, temperature and wind
- biological effects of larger plants and animals and microorganisms
- topographic position, location on top, side or bottom of a slope
- drainage, thoroughness of surface and subsurface drainage, which depends on whether oxidizing or reducing conditions prevailed while soil was being formed.


3. Duration and intensity of soil-forming processes.

4. How people have cared for the soil, including the way they have used machinery, chemicals and organic additions to provide for the growth of plants. Also what efforts people have undertaken to control soil erosion.

Professor Alderfer is in the Soils and Crops Department of Cook College, Rutgers University, New Brunswick, New Jersey.





 by Carol Sclafani

The Pine Barrens, located in central and southern New Jersey, comprises approximately 650,000 acres of pine and oak forests. It was so named by the early immigrants who found its characteristic sandy, infertile soils not suited for agricultural purposes or 'barren,' and bypassed them for the fertile land farther west along the Delaware River. The Pine Barrens is located on top of a formation the geologists call the Cohansey sands. In some areas the sands are as deep as 250 feet. The sand particles do not have the ability to absorb water, but are porous allowing the rainfall to readily pass through to an aquifer below. The aquifer is equivalent to a lake 75 ft. deep with a surface area of 1000 sq. miles. It contains enough water to supply a city the size of New York. Normally, in the U.S. one-third of the rainfall gets into the ground. In the pines, the porous soils allow one-half of the rainfall to reach the aquifer below. Joseph Wharton, a famous Philadelphian, had a plan to use this reservoir to supply the city of Philadelphia with its pure waters in the late 19th century. New Jersey legislation prohibited it, however, and his plan was never executed. All the

streams in the Pine Barrens rise within the pines from this aquifer, emptying into the Delaware River or into the sea. The water is pure and drinkable. The substance that looks like "oil slicks," filming the surface of parts of the rivers, is iron oxide that has been leached out of the sand soils. In a short time after these films have drifted into the sandy banks of the streams, they form a hard composite known as bog iron. It was used in the 18th century to make nails, kettles, stoves and cannonballs, before iron and coal were found close together in western Pennsylvania in the middle of the 19th century.

The soils of the Pine Barrens, unable to retain moisture, infertile, and acid, support a distinctive flora that contrasts with the urbanized area surrounding it. About 800 different species of plants are presently known to exist here—some common, some rare. Fourteen kinds of northern plants reach their extreme southern limits in the Pine Barrens. One of these, the tiny curly grass fern (*Schizaea pusilla*), is common in the swamps of the pines. However, it only occurs farther north in Nova Scotia on the Prince Edward Island, and in the

Magdalen Islands of Canada. One hundred and nine kinds of southern plants reach their northern limits in the pines. The major trees covering the forests are pines and oaks. Fires occur frequently in the forests. The forest floor is dry, most water having seeped below to the aquifer. Leaf litter piles on the floor with few bacteria and earthworms to consume it. These, combined with the natural resins and oils of the vegetation, encourage fires. Over the years, the forest has selected species that are resistant to fire. Pitch pines and shortleaf pines, common in the Pine Barrens, have the ability to sprout back from their base after being cut or burnt. Commercially, the blueberries and cranberries thrive in these acid soils. The cultivated blueberry we serve in our pies was developed largely in the pines. And, a thirteenth of all cranberries produced in the U.S. come from the pines. Also, sphagnum moss, used by florists and nurserymen, is found in quantity here.

Overall, the sandy soils of the Pine Barrens support a unique natural area left, so far, relatively untouched by man.



Soils of the Pine Barrens

Carol Sclafani received her B.S. in plant science from the University of Delaware. She is a field horticulturist in the PHS Community Activities Program.

Intrepid horticulturists ignore the boggy soil to continue their explorations. Note the scrub pine in the foreground, cedars in the background.

photo by Edmund B. Gilchrist, Jr.





SOIL: Q.&A.

1 what is soil?

Soil is a thin, porous material covering much of the earth's surface. It evolves from the breakdown of plants, animals and rocks. Humus, sand and clay in various proportions make up soil.

2 what is the difference between topsoil and subsoil?

Topsoil or the upper layer contains decayed organic matter. Subsoil is tightly packed and contains little organic matter. Both contain nutritious elements. The main difference is in the texture; topsoil is more porous because it contains more organic matter.

3 what is humus?

Humus is decomposed animal and vegetable matter. Peat is an excellent example of concentrated humus. Humus has great water holding capacity. Usually, humus by itself holds too much water for proper plant growth.

4 what is loam?

Loam is a soil mixture containing clay, enough sand to make it porous and humus for needed organic matter. Terms such as sandy loam and clay loam refer to mixtures with additional sand or clay.

5 what do numbers like 10-6-4 on a bag of fertilizer mean?

The first number (10) refers to the percentage of nitrogen contained in the fertilizer. The second number (6) is the percentage of available phosphoric acid and the third number (4) is the percentage of water soluble potash. If

one of the numbers in the formula is zero, then the element is lacking from that particular fertilizer.

6 what do nitrogen, phosphorus and potash do for plants?

Nitrogen produces active vegetative growth. Plants must have an ample supply of nitrogen to produce good dark green foliage. **Phosphorus** produces strong root growth, brighter colored flowers and aids the plants in blooming, maturing and producing a high quality of seed. **Potassium** aids the plant in producing its food. Potassium also helps plants ward off disease. It is important in the formation of healthy tubers and bulbs.

7 what is compost?

Compost is made from decaying plant material mixed with soil. Compost is added to the soil to increase organic matter and to improve soil structure. Bacteria and other microorganisms make humus out of materials in the compost pile.

8 i'm just starting a garden. what should i do to the soil?

First, have the soil tested. Your county extension agent can have this done for you for a small fee. The results of your test will be sent to you along with recommendations for improving the soil and meeting the requirements of the plants you are growing.

9 what type of soil should i use for my houseplants?

Sterilized bagged potting soil is best. Most bagged potting soil contains loam,

sand, peat and usually some perlite. You may add additional peat, sand or perlite to make the soil either heavier or lighter depending on the type of plant.

10 can any type of sand be added to potting soil?

Builder's sand is preferred; the particles are clean, coarse and will provide good aeration. Never use seashore sand; it contains toxic salt and is usually extremely small grained and compacts easily.

11 what is the difference between organic and inorganic fertilizer?

Organic fertilizers are humus or rotted natural material. Inorganic fertilizers are made largely from chemicals. The fertility elements in inorganic fertilizers are as available to the plants as those in organic materials. Because bacteria need a high temperature to release elements from organic materials, chemical fertilizers often work much faster.

12 other than a soil test how can i tell what elements are lacking for proper growth?

Your plant foliage will often indicate particular nutrient deficiencies.

If the plant lacks:

nitrogen, leaves will turn light green or yellow; the veins become reddish.

phosphorus, leaves will be mottled yellow and/or brown. Stalks and veins will turn purple or red.

potassium, leaf tips will turn brown and crumble; the edges will show purple.

iron, veins will remain green while the leaf turns yellow. Edges may become brown.

calcium, tips and edges of leaf curl and turn brown. Terminal buds do not mature.

13 does adding animal manure benefit soil?

Animal manures contain humus-making nutrients. They improve the structure of the soil. All manure should be well rotted before using. Manure breaks down slowly and tends to increase acidity.

14 should i save the ashes from my fireplace? i have heard that it is beneficial to add them to my garden soil.

Wood ash contains a small percentage of potash and lime. It may be added to the garden but should be kept dry beforehand as the useful elements dissolve quickly in water. Coal ash has no fertilizer value.

15 what is meant by a complete fertilizer?

A complete fertilizer contains nitrogen, phosphorus and potassium.

16 what is a soil conditioner?

A material that is added to the soil to improve porosity, aeration, drainage or moisture-holding ability. Sand, perlite and peat are used as soil conditioners.

17 what is top dressing?

Applying fertilizer or other materials to the surface of the soil without working them into it. For example, you "top dress" a lawn because it is impossible to work the fertilizer into the soil without destroying the turf.

18 is there an authoritative source on the pH requirements of houseplants?

There is really no such source at this time. If you are unable to find the pH requirement for a particular plant in a book on houseplants, check to find the native growing area for the plant and then check on the natural soil conditions for the area.

19 there are many soil test kits for home gardeners on the market. are these kits any good?

If you follow the directions supplied with the kits you can get a good analysis. Remember that chemicals break down over a period of time and it is necessary to keep replacing the chemicals you are using.

20 i am told that peat moss is acidic. do i have to add additional lime when i add peat moss to a soil mixture?

Although peat moss is acidic it is not high enough in acid content to greatly affect the pH of the mixture, and it is not necessary to use additional lime.

21 why is charcoal added to the soil for use in terrariums?

Charcoal acts as a filter and prevents the water in containers without drainage from souring. Remember that only plants that can survive extremely moist conditions should be used.

22 do coffee grounds and eggshells add any nutrients to the soil?

Don't depend on eggshells or coffee grounds to build up the nutrient value of your soil; however, they are very good soil conditioners and help to "lighten" the soil. Coffee grounds may be used as they are; eggshells should be broken into small pieces approximately 1/8 in. to 1/4 in. in diameter.

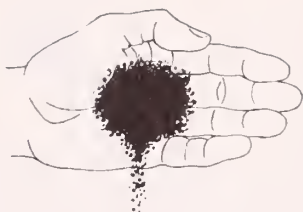
23 when i apply chemical insecticides to my garden plants, do they remain in the soil and for how long?

Very few insecticides persist for long in the soil; they are broken down by sunlight, moisture and soil organisms. Those that do persist are rather well known and have been under attack: chlordane, dieldrin and DDT. When using insecticides be sure to read instructions and use only when absolutely necessary.

15



by Ed Lindemann, PHS horticulturist



TRY SOIL TESTING

guessing is not good enough

Should I lime my lawn and garden this year?
How much should I use?
What about fertilizer?
What kind and how much should I use?
Part of my lawn does not look as good as it should.
Why?

Many of us are faced with some of these questions and problems each year. Too often we guess at the answer. A soil test will take the guesswork out of our decision-making.

To properly treat the soil with lime and fertilizer, you need to know not only the existing conditions of the soil, but also the requirements of the growing plants.

Soils can vary greatly with existing fertility conditions: they vary in part because of the parent material from which the soil was developed and in part from the treatment given the soil. Some soils are acid, some are alkaline. Some soils contain large amounts of plant nutrients, some are deficient in nutrients. Obviously, plants are going to perform differently on these different soils. Not only because of the soil conditions, but also because plants vary in their requirements. Some require acid soils, and some grow poorly or may even die in acid soil. Some plants require high nutrient levels, some perform better at modest levels.

The value of a good soil test pro-

gram is to determine how much lime or fertilizer is needed based on the needs of the plants to be grown and the existing fertility level of the soil.

You can also reap economic and environmental benefits by liming and fertilizing according to soil test recommendations. Fertilizers are scarce and expensive. By following soil test results, you will be sure to use only what is needed. I find that as many home owners have overfertilized as have underfertilized. Where soil fertility levels have been built up, you may need very little or possibly no fertilizer for a year or so.

Of course, overfertilizing also adds to possible pollution problems as the surplus fertilizer is leached out or carried from the lawn or garden. Following a soil test reduces this possibility.

Agricultural Extension Services offer a soil testing program.* Last year Pennsylvania home owners sent more than 15,000 soil samples to Penn State's soil testing laboratory. Each sample was analyzed and interpreted by lawn and garden specialists. Recom-

mendations on the use of lime and fertilizer were sent to each home owner. By following these recommendations, the home owner knew that he or she was applying only those materials needed and in the amount needed.

If you would like to have your lawn or garden soil tested by the Penn State soil testing program, here is what to do:

1. Obtain a Soil Sample Mailing Kit from your county Cooperative Extension Office. Fee \$3.00 (in Pa. Check for correct fees in New Jersey, Delaware or Maryland).
2. Follow instructions in the kit when taking a sample.
3. Give all of the information requested about the area sampled and the plants grown.
4. Mail the soil sample and information in the self-addressed mailing kit to Penn State (or the appropriate agency in your area).

Approximately 10 days to two weeks after mailing you will receive the results of analysis and recommendations on the use of lime and fertilizer.



by W. Wayne Hinish
extension agronomist, The Pennsylvania State University

*See listing for county extension agents or agricultural experiment services on next page.

your extension service

The Cooperative Extension Service of Pennsylvania State University or Rutgers, the State University of New Jersey, the University of Maryland and the University of Delaware probably has an office in your county with a staff of county agents and home economists to give you free, unbiased, up-to-date information in the broad fields of agriculture and home economics.

From the Extension Office you can obtain information not only about soil testing but also about flower and vegetable gardening, your lawn, liming and fertilizing, insect and disease identification and control, home fruit management, planting and care of shrubs and trees, safe use of pesticides and many other subjects. Copies of university publications (bulletins, leaflets and mimeographs) are available free for the asking.

The county agent is an expert with technical training and experience in conditions and problems in your area. His job is to answer your questions and give you helpful advice. When he is stumped, he can call upon a corps of specialists at his State University.

Each county agent holds meetings for homeowners on subjects of interest to the amateur gardener. In addition, since 1961, the agents in Bucks, Delaware, Chester, Montgomery and Philadelphia counties have conducted meetings for nurserymen, greenhouse operators, garden supply dealers, landscape contractors, tree surgeons and building and grounds superintendents.

Your county agent is as close as your telephone. Following is a listing of the addresses and telephone numbers of the agents operating in the Delaware Valley.*

COUNTY	AGENT	ADDRESS	PHONE
Bucks	Richard A. Bailey	Neshaminy Manor Center Doylestown, PA 18901	215-DI 3-2800
Chester	Robert A. Powers, Jr.	Court House North Wing West Chester, PA 19380	215-696-3500
Delaware	James J. McKeehen	Toal Building Media, PA 19063	215-LO 6-0142
Montgomery	Joseph H. Way	400 Markley Street Norristown, PA 19401	215-277-0574
Philadelphia	William H. White	S.E. Cor. Broad & Grange Sts. Philadelphia, PA 19141	215-HA 4-0650
Burlington	Richard L. Washer	County Office Bldg. 49 Rancocas Road Mt. Holly, NJ 08060	609-267-3300
Camden	Robert G. Ruizzo	County Extension Service Bldg. 152 Ohio Avenue Clementon, NJ 08021	609-784-1001
Gloucester	Robert W. Langlois	County Office Bldg. N. Delsea Drive Clayton, NJ 08312	609-881-1200

*For information about soil testing in northern New Jersey, write to: Rutgers, The State University, Department of Horticulture, New Brunswick, N.J. 08903. For information about soil testing in the Baltimore area, write to: Maryland Agricultural Experiment Station, University of Maryland, College Park, MD 20742; in the Wilmington area, write to the University of Delaware, School of Agricultural Sciences, Newark, DE 19711.

a productive fallow ... green manure

To many, planting green manure seems a wasteful practice left over from long ago when our country had a great surplus of productive land. Not so. Green manures have been an important part of intensive agriculture for centuries. Today their use is just as practical for gardeners who want to get the most from their land as it has been for the Chinese who have used them to support the intensive and continuous cropping of their land for over 40 centuries.

Green manure crops are usually a grain or legume grown specifically to be tilled back into the soil while they are still growing. These green manures do two special things and provide a lot of other benefits in the bargain. First, they capture the sun's free energy and store it as organic food for the soil's essential microorganisms. Second, they absorb nutrients from the soil that would otherwise be leached away by rain and snowmelt. They store these nutrients as natural slow-release fertilizer. In fact, if a legume is used for green manure, some of the sun's free energy is used by the plant-bacteria system to change nitrogen from the air into a form that plants can use. This stored and converted nitrogen fertilizer can feed the garden throughout the next growing season.

Among the other benefits from the use of green manures are improved soil texture, reduced erosion, weed control, improved winter garden appearance, and increased garden production. Soil texture is improved by the organic material from the green manure, which composites in place within the soil. In a clay-based soil this *in situ* compost will aggregate the very fine clay particles and form a looser structure that lets air and water into the growing plant roots. In sand the green manure compost will act as a sponge to increase the available moisture and nutrient level.

Although wind erosion is usually associated with the prairie states, here in the Delaware Valley winter winds can blow away great quantities of dust and fertile topsoil. Some years ago the problem was so serious that the Soil



Conservation Service offered an economic incentive to farmers in New Jersey if they used winter rye as a green manure in their fields. The advantages of this living erosion protection were so great that now, even without government payments, it is common practice on most farms. Over the winter green manure can give gardeners the same advantages, and if the garden is on a slope it will protect from erosion by rain runoff and the melt of winter snows.

Most green manures grow so fast that nearly all weeds are smothered. Even if some do survive, the green growth is tilled into the ground before seed has set. This reduces the potential weed population for next year, and there is little danger that the green manure itself will become a nuisance. In fact, if planted in the fall, the winter growth of a green manure gives the garden a lawnlike appearance.

In August the parts of the garden that have produced spring crops are beginning to look tired. Onions are harvested and early corn is finished. The areas once occupied by these crops can usefully be replaced by a green manure to take advantage of the three or more months of growing season that remain. In the case of widely spaced crops like corn, seeds of most green manures can be sown between the rows just before harvest. They will come up quickly to cover the ground once the harvested residue is chopped down by a rotary mower. In other areas the crop residue should be mowed and tilled or spaded under before the green manure is planted. This is a good time to apply lime, rock phosphate and a light application of fertilizer. Seeds of green manures are usually sowed broadcast and raked lightly into the prepared ground.

Good green manure crops to plant in the fall are the winter grains. Rye and wheat will make an attractive carpet during the winter months. Kale, though it needs protection from rabbits and insects, is also a good winter choice. In addition to giving good foliage cover, its winter greens are a delicious side benefit as a salad. Some people have also used turnips as a fall-winter green manure crop, and harvest a portion of them for their winter meals.

Some garden areas remain productive too late in the fall for a green manure crop to germinate. These can be planted during the cool weather of early spring. Peas sowed broadcast are a good choice. They grow quickly, fix nitrogen, and can be tilled under to give space for heat-loving summer vegetables.

As the season progresses, spring crops such as radish, lettuce and spinach stop producing. Soybeans can replace them as a green manure. Soybeans are a particularly good choice because they grow rapidly in warm weather and fix nitrogen which can be used by fall vegetables. Buckwheat is another good summer crop to increase soil organic content and store the sun's free energy. During the summer, nature, if left to herself, will produce a free crop of green manure—weeds. If they are tilled in before they set seed in the fall they are a fine source of humus. In the winter the common weed covers such as peppergrass and chickweed are attractive and provide spring humus. Also, if you favor natural foods, they can be used in winter salads.

There is one caution when green manure is used. After it is tilled into the soil the area should rest a week or two before new seeds are planted. Time is needed to let the green manure lose its heat and begin to compost.

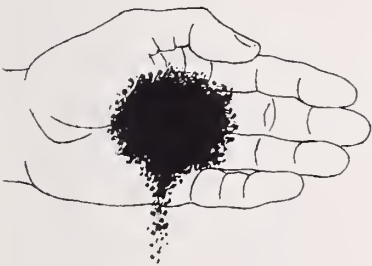


John Gyer learned the agricultural use of green manure from his father when they returned a long abandoned farm to full production. Now, after a lapse of years, he has effectively applied this technique to his New Jersey garden.



Gardening on Rescued Soils

19



by Gary Koller
curator, Morris Arboretum

As the wreckers and bulldozers batter buildings into oblivion, a happy fantasy springs to the minds of the onlookers: instant gardens replete with trees, shrubs, flowers, water, children, birds and happy relaxed people. Planners succumb to these fantasies as well. But between the planning board and the exuberant opening of such a city garden or square, there's many a slip. In such planning soil preparation is of paramount importance.

When rescuing old building sites for garden areas, it's important to consider the soil's probable deficiencies. Clearly, if a building has been astride the area,

only subsoil and the building's foundations are usually there. The soil around the building, unless planted, is generally compacted, structurally poor, sterile and suffused with damage from de-icing salts or from any one of the infinite number of chemicals polluting the environment. If the site has been cleared and abandoned for awhile, the debris and litter may go deep in spots, often occurring in layers; around the foundations, such litter might rise to the soil's surface. These pockets aid drainage but may reduce the water-holding capacity of the soil. Buried rubble also makes digging difficult and

continued

...rescued soil

obstructs normal root development.

Drainage problems need special attention. Beneath many rescued sites the floor and walls of the basement remain intact. They form a basin that restricts downward and lateral movement, causing poor drainage. Sites with a finished grade below surrounding surface levels will be inundated with water from each rain.

Backfill in holes or low areas is usually the building debris referred to earlier, mixed with imported soil. Such a mix is generally poor in quality both organically and structurally. Final grading covers the whole area with several inches of topsoil providing a cosmetic effect over the hidden rubble. The soil settles into low areas, which can become small ponds with each rain. The South Coast Botanic Garden on the Palos Verdes Peninsula rests on top of 3½ million tons of trash in depths ranging from 5 ft. to 165 ft. Decomposition is causing the whole area to settle unevenly.

Underground utilities, which can present problems, are overlooked on many sites, whether urban or rural: sewers, electrical or phone lines, water mains, gas mains and even steam lines. One Philadelphia man wanted to plant trees on a small reclaimed property. Unfortunately, not only was his space limited but there was a steam line 5 ft. below the area where he wanted the trees. Carefully selected plantings would have survived the limited soil volume, but never would they have survived the baking and drying from the steam lines. He did not plant.

What can be done about some of these problems? For one thing, any available topsoil on the site should be salvaged for further use and not bulldozed into the old basement or septic tank.

Whenever possible, remove the large pieces of rubble from the site; however, when debris is buried it may be difficult to locate. A thin, rigid lance can be used to probe for buried debris; large pieces should be excavated and removed. My house is located on the site of a previous structure. In prepar-

ing one bed I encountered cinders beginning six inches below soil surface and running to a depth of several feet. Eventually, I discovered that it was the site of an old driveway. Another area supported a crop of grass but excavation exposed a layer of asphalt, again remnants of an old drive. Generally these obstacles are not apparent until digging exposes them and in some instances the barrier is immovable forcing you to make alternate plans.

Before you backfill, check to see if the basement floor of the old structure has been buried. If it has, be sure to crack it or have drainage tiles installed through the floor so that trapped water will drain away. When filling any



Large paved areas can be made more interesting, and the soil improved, by creating a space for plantings. The tree is a *Cornus florida*.

large areas with soil, the lower portion can be backfilled with soil of a poorer quality. Soil returned to the top 12 to 18 inches of the whole site, however, should be the best available and large quantities of organic matter should be added.

After final grading is accomplished you are generally left with a totally artificial soil unlike anything occurring naturally in the area. At this stage it is wise to send representative soil samples to the soil testing laboratory at

Pennsylvania State University. The soil should be identified as highly modified and it should be analyzed for organic content and nutritional needs for ornamental or vegetable crops.

Many times all of the preceding steps will be accomplished before you arrive on the site. The first rain may tell you that your site is poorly drained and analysis will show that your soil is structurally and nutritionally inferior. What can be done? Probably the easiest solution is to garden in raised beds where excess water will flow to grade level and away from the plantings. Raised beds make maintenance easier: the edges are well defined and height requires less kneeling or bending to plant or weed. Varied levels add visual interest to a landscape.

It is easier to create good soil conditions in the raised bed area than to struggle to improve the soil on the whole site. Soils in each bed can be amended differently to grow varied plant types. For example, one area can have a higher percentage of sand and gravel for cactus and succulent plants, another an acid pH for ericaceous plants and still another with abundant organic matter and high fertility for those plants that are heavy feeders.

The beds can be raised in a number of ways including masonry walls, railroad ties, and drystone walls. Which-ever technique is used, remember to allow drainage outlets along the lower edge so that excess water drains away rapidly. Never use materials that are toxic to plants such as railroad ties freshly treated with creosote.

Another approach to improving impoverished urban soils is to reconstruct the area to create mounds. As in any design, develop strong flowing lines rather than weak undulating ones. The mounds can be used to define and accent the path through the garden area. If the pathways between the raised beds or mounds remain wet the area can be surfaced in gravel or other paving materials.

As we acquire a new respect and increased need for urban plantings, increasing attention and energy will be directed toward rescuing urban soils.



The five-story apartment (pictured) stood on the existing park site in Wilmington. The building was removed to make way for the construction of the park, Fountain Plaza. All of the foundation walls and most of the basement floor were removed from the site. Only a small portion of the basement floor remained; the floor was totally cracked to provide for water percolation. The entire cavity of the basement was filled with a select fill (the highest quality of fill available). Approximately 18 in. of topsoil was provided for the top layer.

The park was built approximately eight years ago. Because the site was so carefully prepared there has been no settling or shifting of the construction elements there. The photo was taken at the time of the planting; the landscape architect, Edward R. Bachtle of Wilmington, reports that the foliage has filled out and has become lush. Bachtle's firm has received several major awards for the park design.

Included in the planting were: white fir trees (*Abies concolor*), deodar cedar (*Cedrus deodora*), Swiss stone pine (*Pinus cembra*), willow oak (*Quercus phellos*) and shamrock ivy (*Hedera helix* cv. Shamrock).



GROWING PLANTS WITHOUT SOIL



photos by author

The solution in the jar at left was continuously aerated with an aquarium pump. The solution in the jar at right was not aerated and lack of oxygen limited the root growth mostly to the upper third of the jar.



by Hans A. Zutter

Hans A. Zutter is associate professor of horticulture and chairman of the Food Crops Section at the Ambler Campus of Temple University. Zutter has done research in plant nutrition, using hydroponics, natural and artificial soils.

soilless culture

After all of the articles in this issue of *Green Scene* emphasizing the importance of soil in growing plants, it might be challenging to consider that plants can be grown successfully without soil. "Soilless culture," the expression used to describe the process, means different things to different horticulturists. I'll begin by explaining some of these differences.

Soilless culture is any method of growing plants without natural garden or field soil or compost.

Artificial soil or manufactured soil is any organic or inorganic substrate* other than natural soil suitable for plant growth. Artificial soil may consist of peat moss, vermiculite, perlite, peanut shells, sand, gravel, coal chips, or any other suitable material or mixture.

Hydroponics (same word singular or plural) is a setup for growing plants in water or nutrient solution, sometimes in conjunction with sand, gravel, cinders, or other inert material to give some support to the roots. Hydroponics does not describe a coleus cutting rooting in a jar of plain water. Adding nutrients to the water, aerating the solution, and other conscious efforts to grow the little coleus into a good plant would justify using the words "hydroponics" or "water culture." Adding sand or gravel to the jar would still make it a hydroponics, but "sand culture" or "gravel culture" would also be appropriate and more descriptive.

For no specific reason, plant and

soil scientists in the U.S. and elsewhere tend to use the words water, sand, or gravel culture, whereas commercial growers prefer the more general word hydroponics.

artificial or manufactured soil

Three or four decades ago commercial plant growers found it more and more difficult and expensive to dig up and prepare the large amounts of soil needed to grow the ever larger number of potted and bedding plants. It also became increasingly expensive to transport potting soils over long distances if they were not locally available.

A search for alternate growing substrates began through the combined efforts of scientists at horticultural experiment stations in North America as well as in Europe. Initially, mixtures of clay, gravel, peat moss, and anything else available cheaply and in large quantities were tried.

For many years now a large part of our horticultural crops has been grown successfully in artificial soils. Probably best known is the so-called Cornell Mix, which consists of peat moss and vermiculite or perlite plus fertilizer. In recent years the word "peat-lite" has been used commonly for peat-vermiculite-perlite mixes.

Peat-lite mixes are easily prepared. A good mixture consists of one gallon vermiculite, one gallon peat, one tablespoon superphosphate, four tablespoons 5-10-5 fertilizer, and one tablespoon ground (or pulverized) dolomitic limestone (available at most gar-

den centers). In most cases it is much more convenient and probably no more expensive to purchase one of the ready-made mixes available under the trade names Jiffy Mix or Pro-Mix.

Artificial soil mixes are useful to anybody growing just about any kind of plant. The artificial soils are free from diseases and from weeds. They are light and clean, and most plants grow well in them.

Peat-lite mixes are good for raising most seedlings because they hold water well once they are thoroughly moist. When the seeds have germinated, seedlings transplanted into peat-lite mix do exceptionally well if they get frequent weak fertilizer applications. Any of the water-soluble complete fertilizers will work. With a bit of experience the fertilizer level can be easily adjusted to produce healthy and well-nourished plants.

To maintain houseplants over a long period of time in the home, and for repotting houseplants, peat-lite mix alone is not always satisfactory. One of the main problems is the continuous need for fertilizer, and another is that the organic matter that makes up part of the bulk of the artificial soil mix is gradually decomposed by naturally occurring bacteria. Consequently, the soil level in the container gets lower and lower. The peat-lite mix is also easily washed out of the pot during repeated waterings. Dry peat-lite mixes are very light and large plants tip easily. This can be corrected without much trouble by mixing peat-

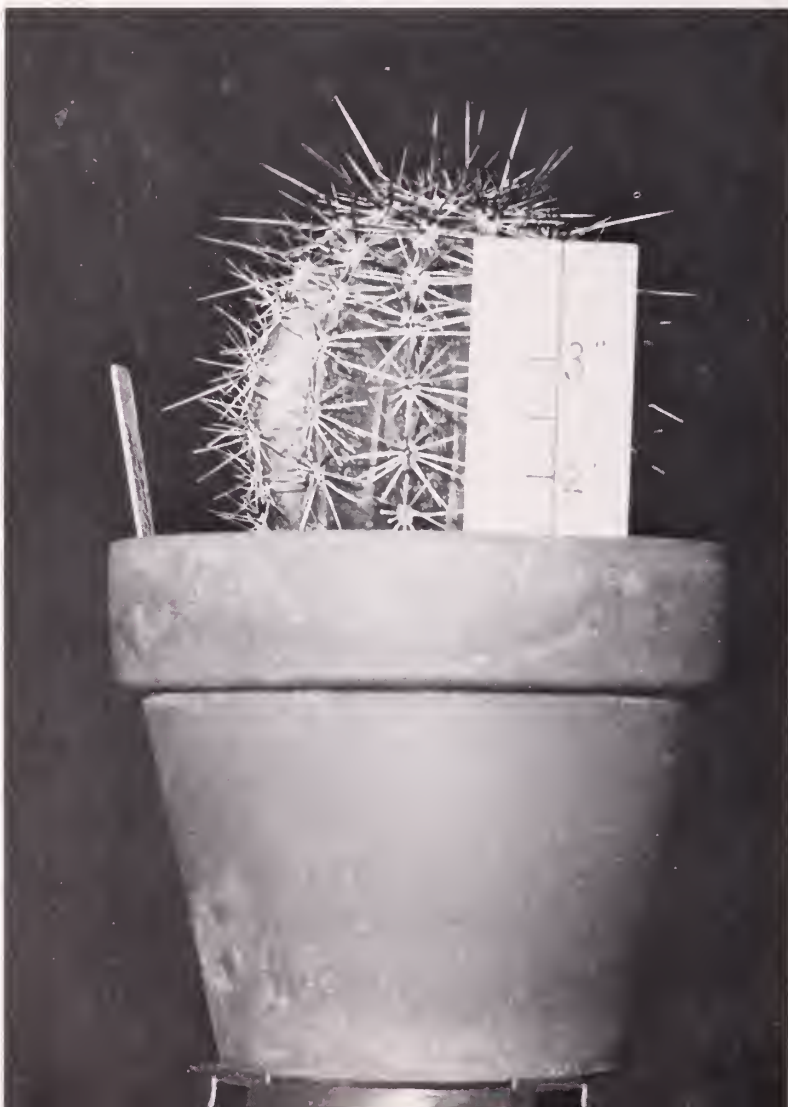
continued

*Substrate as used in this article means material accommodating roots.



Above: Tomato plants grow very nicely in nutrient solution. This Tiny Tim in a one-gallon jug can be maintained in a very small area with little effort.

Below: This *Carnegiea gigantea* grows well in a peat-lite mix. Splashing water and bacterial decomposition have reduced the amount of peat-lite in the pot. The plant now sits much too deeply.



lite mix with an equal amount of the sterilized compost sold in many stores.

One very important use of artificial soil is the widespread use of perlite as a rooting medium. In a well-drained flat or pot it is almost impossible to overwater perlite. And aeration is excellent. It is necessary to check the perlite daily for dryness.

Almost any plant can be grown well in peat-lite or a similar mix or other non-toxic substrate. The only important difference is in the handling of the plants. Some plants should receive less water than others, and some plants need less frequent fertilizing than others.

hydroponics

Commercial plant growers as well as amateurs, from school children to senior citizens, have tried their hands at hydroponics. Commercial installations in the southern parts of the United States produce good crops of winter tomatoes at a reasonable profit. In other parts of the world hydroponic methods are used to grow lettuce and other food crops, as well as a variety of flowering plants.

The obvious benefits of hydroponics are that you can avoid soilborne diseases, and you can control the supply of nutrients. Hydroponics, well handled, will produce as well, but not much better than a well-managed soil culture.

Commercial hydroponics installations have not been successful in our northern region because of the low



The raw materials for a good artificial soil mix are inexpensive and easily obtainable in most garden stores.

light intensity during the winter months. No amount of nutrients and water can compensate for the lack of sunshine. Successful hydroponics are usually found in warm climates with high light intensity.

Serious gardeners considering a hydroponics setup will find it a most interesting and educational experience. There is no better way to learn about the nutritional needs of plants as with a hydroponics. A hydroponics requires watertight containers, beds, or benches, and involves some effort. It will be necessary to provide a means of aerating or circulating the nutrient solution. This can be accomplished with an aquarium type air pump or a submersible water pump.

Many widely different recommendations for nutrient solutions are available. Refer to the literature cited at the end of this article. A simple nutrient solution, and I will not guarantee the results, can be prepared by stirring the following materials into 10 gallons of water:

- 1 tsp. ammonium phosphate
- 2 tsp. potassium nitrate
- 3 tsp. calcium nitrate
- 1/2 tsp. epsom salt
- 1/8 tsp. iron sulphate

This mixture works best if fertilizer grade materials from a garden store are used rather than laboratory grade chemicals. The impurities in the fertilizer grade salts supply some of the much needed trace elements. The solution should be replenished as needed and should be changed once

every week. It will also be necessary to prepare a separate solution of a flat toothpick full of iron sulphate in a quart of water. A few drops of this are added to the nutrient solution every other day to prevent iron deficiency.

For really professional results it is helpful to have some background in chemistry. It would also help to prepare solutions of trace elements as described in the literature cited later. Ready-made complete nutrient mixtures cannot be easily purchased at this time because of manufacturing problems.

Many different plants root and grow in plain water. Tradescantia, zebra, coleus, nerium, several varieties of draceana, some of the small leaved philodendron, and many other plants grow quite well in tap water. The addition of a small amount of water-soluble fertilizer might improve plant growth considerably. Any water-soluble complete fertilizer will do nicely if it is used at about 1/4 strength or less. Too much fertilizer in the water is probably worse than too little because the plants would grow too succulent and could not last long.

To grow plants in water it is best to use containers made of clay or plastic or colored glass to keep light away from the water. Water in clear glass containers will soon turn green and messy from algae growth.

Plants rooted in water do not survive well when they are transplanted into soil. Water grown roots are very succulent and usually have no root

hairs to take up water from the soil. Consequently, the roots dry up quickly and that is the end of the plant. Plants growing in water should be left there. When it becomes desirable to put such a plant in a pot it would be best to start with a fresh cutting rooted in perlite.



reading suggestions for additional information:

D. R. Hoagland and D. I. Arnon. *The Water-culture Method for Growing Plants without Soil*. Circular 347. California Agricultural Experiment Station.

Good instructions for nutrient solutions, and some nice photographs.

H. Peter Loewer. *The Indoor Water Gardener's How-To Handbook*. Popular Library, 1973. (\$1.25)

A paperback for the beginner. Contains a good listing of plants suitable for water culture.

Walter H. Phillips. "Hydroponic Gardening in the Virgin Islands," *American Horticulturist*, Volume 53, Number 5, Winter 1974.

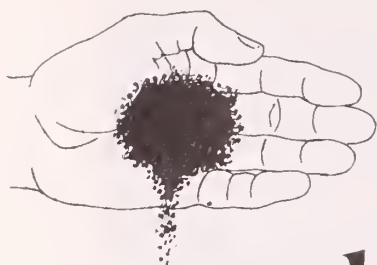
Good explanations and two fine diagrams showing two different methods of hydroponics.

T. Saunbe. *Soilless Culture*. Transatlantic Arts, Inc., 1972.

Very detailed instructions for hydroponic culture of a variety of plants. Well-illustrated.

C. E. Tiquet. *Successful Gardening without Soil*. Chemical Publishing Co., 1953.

A thorough discussion of different types of hydroponics, calculation of nutrient concentrations, cultural instructions, and a bibliography.

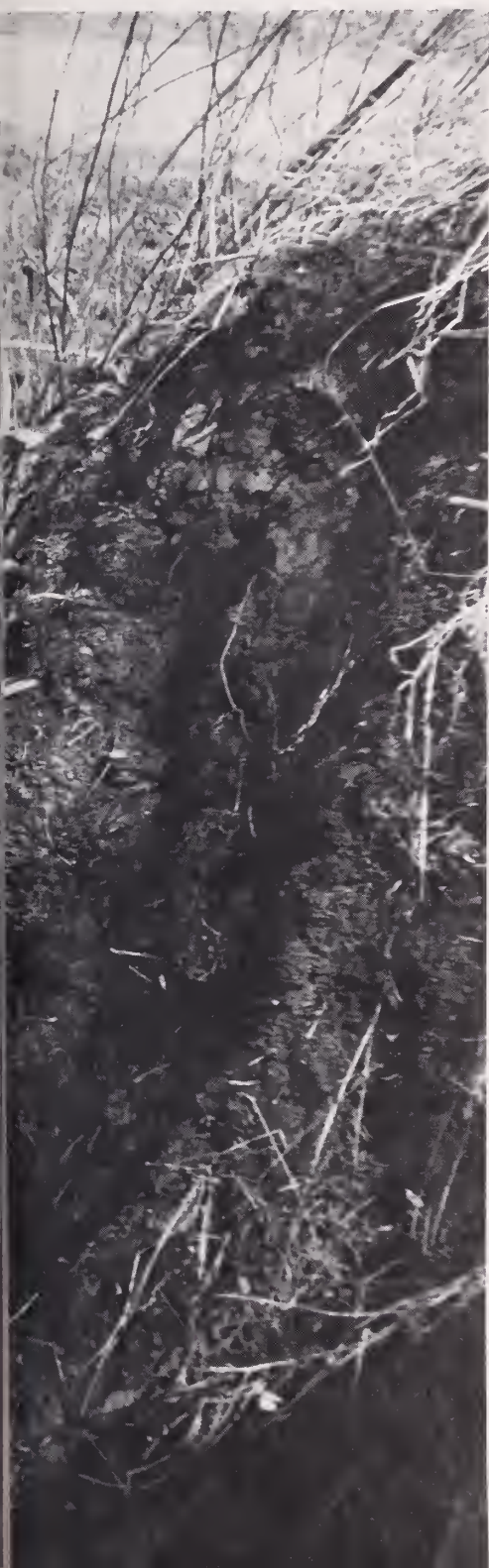


humus from the



dump

Edythe Collins shovels humus at the municipal dump.



Our home is not far from the Pine Barrens where growth is predominately pitch pine (*Pinus rigida*) and short leaf pine (*Pinus echinata*); several species of oak are also common. The soil is white sand, acid, and is largely unfertile except for the plants of the area, and there are many. Home construction for the expanding suburbs has led to more vegetative debris around property, which has to be picked up by the various municipal services and hauled to the town dumps where it is deposited separately from trash. The trucks compact the material, which makes it decompose faster. So there are piles of a mixture of pine needles, oak leaves and sand that take about two years to break down into a rich acid humus. You have the same mixture that nature provides for the pine barren plants.

I collect this humus from the dump in heavy-duty plastic bags, or sometimes my husband borrows the company truck. With good luck the municipal highlift is nearby and the operator kindly loads the truck. If you happen to be a resident of the municipality you can have a truck bring it directly to your home, and this is good, since it makes good use of what might otherwise be wasted.

The soil at my home is sandy loam and drainage is not a problem. Even so, I dig 18 in. deep to clear out all the existing soil. I then mix some of the removed soil with the pine barren humus, refill the area and let it settle. If it were clay soil I would dig 24 or more inches deep and put drainage material in the bottom before refilling. The bed is prepared before the plants arrive so they can be planted immediately on arrival. On some occasions we've used flashlights and car headlights to do the planting when we've gotten home after dark from a rescue. The new plants are watered and some



by Edythe Collins

Edythe Collins collects humus for her woodland wild flowers, rock garden and moraine in southern New Jersey. She is a member of the American Rock Garden Society, as well as the Delaware Valley Chapter and the Alpine Garden Society.

fresh pine needles spread lightly on top for a mulch.

This procedure has been successful with pyxie moss (*Pyridanthera barbulata*), sand myrtle (*Leiophyllum buxifolium*), inkberry (*Ilex glabra*), *Hudsonia ericoides*, wintergreen (*Gaultheria procumbens*), *Kalmia angustifolia*, *Kalmia latifolia*, lady slippers, cranberry, shadbush, leatherleaf, sheep laurel, sweet pepperbush, and last but certainly not least, trailing arbutus (*Epigaea repens*). I cover the arbutus completely with humus and fresh pine needles, which add more acid humus as they break down. The plant will grow through the mulch. Arbutus is an acid-loving plant, and Dr. Wherry has suggested that it not be planted where earthworms are present since the worms can bring lime from the subsoil to the surface. The same mixture of dump-procured humus is used also in and near my bog for sundew, club moss, and *Helonias bullata*. And the mixture is also excellent for use as a topdressing instead of fertilizer on rhododendron, azalea, shortia, and all acid-loving plants.

Anyone fortunate enough to have or to be able to collect pine needles and oak leaves can mix them together with a little sand to form a compost pile for use on acid-loving plants. You'll be pleased with the results.

With a little urging, I believe that any municipality that has a prevalence of oak and pine would cooperate with its gardening citizens and stockpile the collected leaves and needles in an area where interested users could pick them up. Their location should be made known through the media and by signs and other invitations to pick them up as it is done for the dump where I collect.

To my good friend who introduced me to the dump, I will be eternally grateful.

the soils of the Morris Arboretum,

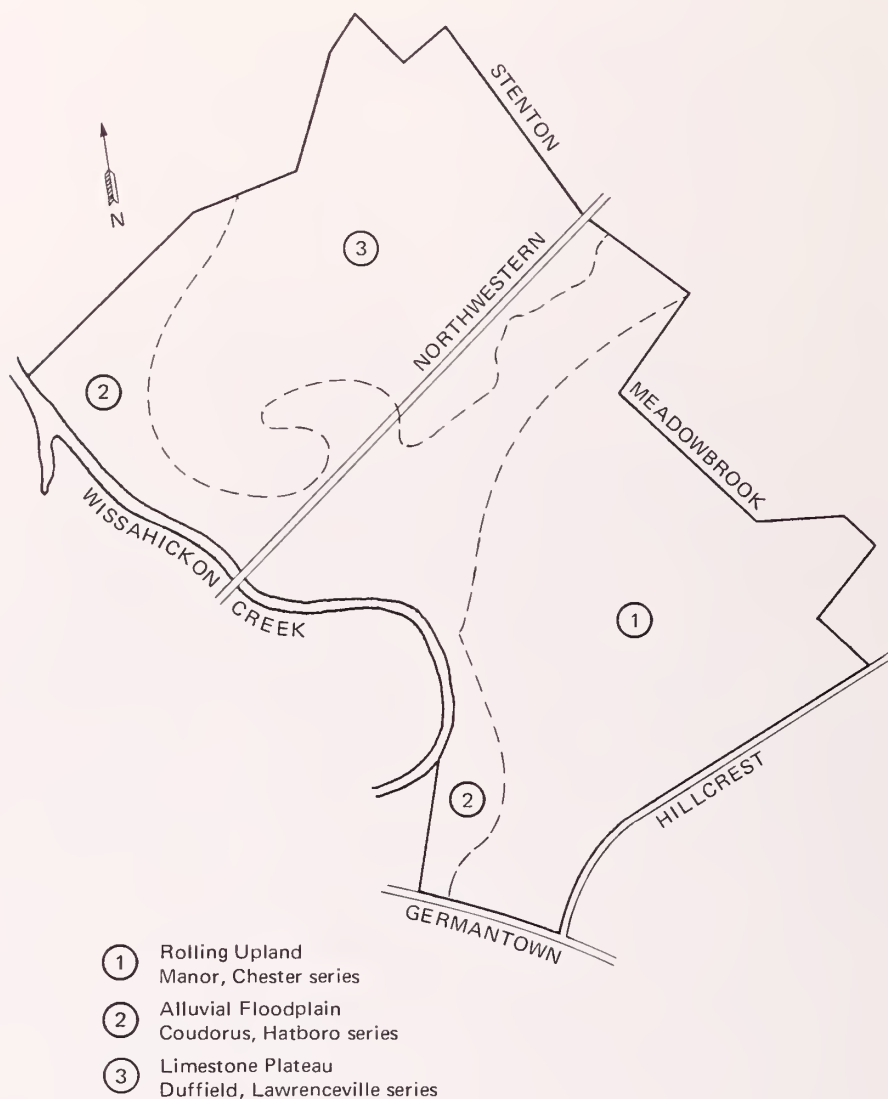


Figure 1.
General Soils Associations, Morris Arboretum

Chances are that John Morris did not concern himself too much with geology or the soils when he began to acquire the properties for a country home near Chestnut Hill in 1887. However, having the perceptive eye of a dedicated plantsman and a planner, he must have recognized that a wide variety of trees and shrubs were growing and that many others would grow on a tract of such diverse physiographic features.

When he bought the property, we believe there were red oaks with an understory of dogwood, azalea and blueberry dominating the hills, while hemlock, chestnut oak and sweetbirch took over the steeper creek bank. Elms, walnuts, hickories and white oaks were prominent on the undulating plateau above Northwestern Avenue. River birch, tulip tree, sycamore and boxelder with spice-bush underneath preferred the flood plains of the Wissahickon.¹ Thus the 175 acres of tranquil, rolling to nearly level terrain that were one day to become the Morris Arboretum, were a fortuitous choice as a place to grow, to display and, most important, to conduct research on a wide selection of woody plants from the Northern temperate zones of the world.

Subsequent surveys^{2,3} classified the soils of the Morris Arboretum into three general groups shown in Figure 1. The main groups are:

- the strongly acid Manor and Chester series* overlying weathered gneiss, schists and quartzite on the

*Refers to the locality where a particular soil was first characterized and documented.



a fortuitous choice

rolling uplands of the main grounds (area 1, illustration);

- the neutral to moderately acid Duffield and Lawrenceville series with underlying limestone on the farm area, above Northwestern Avenue (area 3, illustration);

- the slightly to strongly acid Coudorus and Hatboro series of the alluvial floodplains on the wide flat meadow below Northwestern Avenue and along the Wissahickon Creek (area 2, illustration).

Since an important role of an arboretum is to determine the adaptation and use of trees in the man-made environment, research should be conducted on the scalped, bulldozed and otherwise ravaged soils following the "progress of development."

The upland soils are described generally as deep, permeable and well-drained with 'good' ratings for tree growth and productivity for the Manor and Lawrenceville series, and 'excellent' for Duffield and Chester. The moderately well-drained Coudorus and poorly drained Hatboro, even with their higher water tables and frequent flooding, are still rated 'good' and 'fair' respectively as tree producers. The texture of the surface layers of all the soils on the Arboretum is classified as silt loam.

Within each of the three sections natural or contrived microsoil conditions are useful for demonstration or studies of plant adaptability to specialized conditions. Natural examples of these conditions are an intriguing and unusual limewater bog, the steep bank

of the Wissahickon, or the floodplain itself. The children's "Grow-It!" gardens, fortunately, are on one of the most inherently productive soils in the county. The contrived or highly modified soils of the Arboretum include the artificial "acid bog," a plastic lined pit filled with strongly acid peat; the heath garden to which great quantities of peat were added; or the new cactus and succulent garden, which has been highly modified with sand and gravel to provide essential drainage for plants that prefer "dry feet." Since an important role of an arboretum is to determine the adaptation and use of trees in the man-made environment, research should be conducted on the scalped, bulldozed and otherwise ravaged soils following the "progress of development." The recently completed sewer line across the Arboretum's floodplain, excavated to a depth of 25 ft., provides a typical disturbed urban soil situation.

The Wissahickon Creek that John Morris knew ran clear and unpolluted. It powered several grist mills with its steady flow. Today the Wissahickon, even on good days, is murky. Overflows on much of our floodplain are occurring with greater frequency. An unwise landfill on the floodplain opposite our steep bank restricts the flood crest to a narrow channel, backing it up onto the Arboretum's lowlands. Greater velocity, caused by restricted channeling, is badly eroding the outer bank as it turns to go under Germantown Avenue. The increased flow into

our meadow from above Stenton Avenue is due to heavy urbanization and impervious surfacing over large areas of Springfield Township. Runoff is accelerated rather than percolated and stored into the soil.

The Wissahickon runs "chocolate brown" at flood stage with the high load of silt eroding from the unprotected urban and cropland areas upstream. We have actually measured one to two feet of new deposits over some of the permanent grid markers in the floodplain installed flush with the surface only 13 years ago. This is a warning signal of serious problems that require immediate erosion control measures upstream and throughout the entire Wissahickon watershed. Plants and man depend on a thin but vulnerable mantle of precious soil that concerned citizens everywhere should make every effort to preserve.

references:

1. Wherry, Edgar T., 1955. "Notes on the Geology and Ecology of the Morris Arboretum," *Morris Arboretum Bulletin* 6:39-42.
2. Smith, Robert V., 1967. *Soil Survey of Montgomery County, Pennsylvania*. U.S.D.A. Soil Conservation Service.
3. George, John C., 1974. *Soils Data for the Morris Arboretum*. Montgomery County Soil Conservation District.



by Gordon A. Brandes
manager, Morris Arboretum

Gordon A. Brandes has been manager of The Morris Arboretum for the last three years. Before that he was manager of product development and field research with agricultural chemicals for a major Philadelphia based chemical company. In that job he was involved with commercial crops throughout the United States, Canada and parts of Europe.

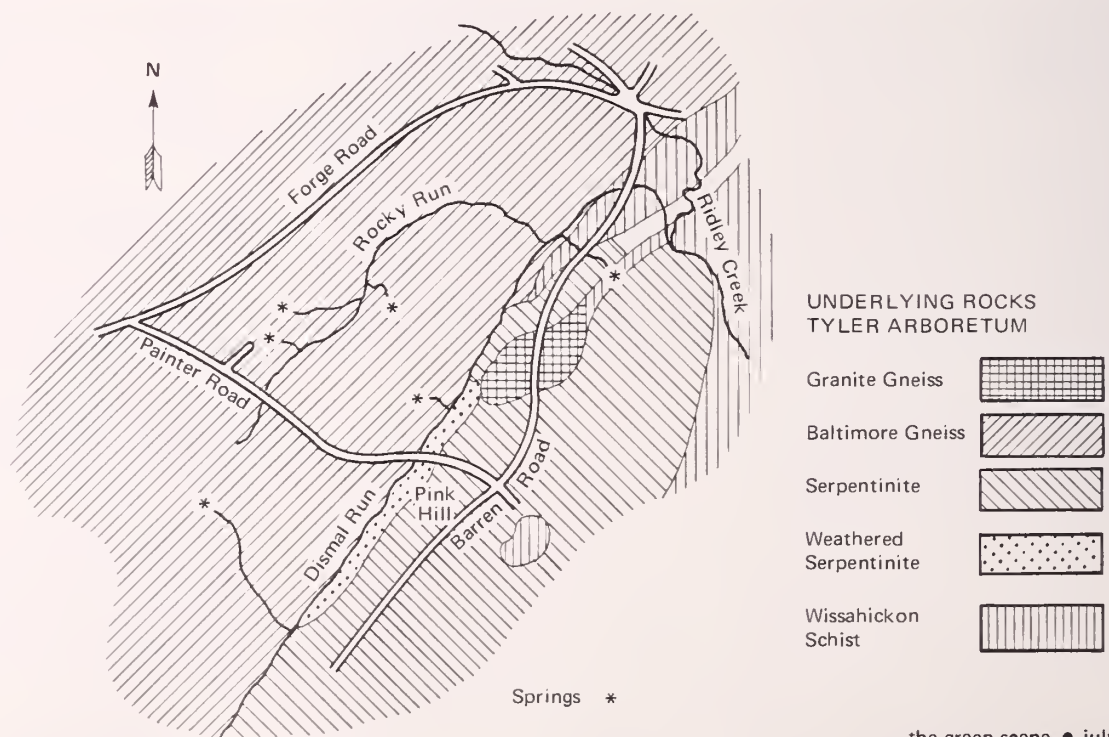
Brandes was a botany major at North Dakota State University with a minor in soils. He worked with the Soil Conservation Service after graduation. He says he can't remember when in his life he hasn't been interested in gardening and farming.

soils and springs of the John J.



The bald cypress (*Taxodium distichum*) develops its characteristic knees in the moist soil at the junction of two small streams.

30





THE
TYLER ARBORETUM

515 Painter Road • Lima • PA 19061
Lo 6-5431

Tyler Arboretum

Most of the soils at the Tyler Arboretum are classified as silt loams. On Pink Hill we have some gravelly silty clay loams on slopes eroded by the weather. These soils are derived from very ancient rocks. Those of the greater part of the Arboretum's 700 acres lying northwest of Dismal Run developed from Baltimore gneiss. They are relatively rich in the minerals necessary for plant growth, and this is well demonstrated by the natural deciduous forest of many species which flourishes along Rocky Run, in the North Woods, and on the slopes northwest of Dismal Run.

The old woodland has never been clear cut. Although trees have been removed for many purposes since the Minshalls first settled here about 1711, and although cattle were customarily pastured in woodlands until fairly recently, there has been a wonderful accumulation of humus. Soil has also been washed down on these slopes from the higher, fairly level ground that for two centuries was under cultivation. It is a pleasure to dig down into this deep woodland soil, just to get a handful to hold and squeeze, to note its resilient structure and its rich brown color, and to smell its delicious fresh earthy smell. On the upper parts of the slopes the soil is more acid than it is farther down, and on the lowest areas it tends to be neutral.

On the edges of some of this old woodland, on upper slopes where trees are reclaiming some of the formerly cultivated land, rhododendrons find conditions in which they thrive. In the North Woods, too, where a hurricane opened a sizable area, rhododendrons show that the soil acidity is to their liking.

The soils on the more gently sloping upland must have been in the class of silt loams with the same wonderful structure as that of the woodland before the forest cover was removed and crop after crop of corn and other grains grown. But as late as the early 1960's it was possible to grow corn

and tomatoes on some of these old fields with the aid of some fertilizer.

We do not know when farming of most of these fields was given up, but it was probably in the 1930's. When the property came into the hands of trustees upon Mrs. Tyler's death in 1944, there was a thick growth of saplings coming up. Most of these were cleared away, and the fields kept mowed thereafter. Our Pinetum now occupies much of this area. As the conifers grow, the litter from their fallen needles will accumulate, and make the soil beneath more acid.

Organic matter is being restored in these old fields in a way that may not be known by some gardeners. It comes from the decay of grass roots, and is important because this humus collects below the surface of the ground. The roots, extending to considerable depth, also bring up a fresh supply of minerals, and these tend to enrich the upper layers during the slow but continual process of growth and decay.

The other important underlying rock of the Arboretum is serpentinite. It extends across the property from southwest to northeast, bounded on the northwest by Dismal Run and the northeast bend taken by Rocky Run on its way to join Ridley Creek. It extends beyond Barren Road until it meets another rock formation known as Wissahickon schist. The whole area of shallow soils derived from serpentinite has long been known locally as the Barrens, hence also the name of the road that crosses it.

Everyone who is well acquainted with the Tyler Arboretum knows Pink Hill. In this section of the Barrens where the soil is thinnest over the underlying rock, we have a bit of bluestem prairie. Up along Barren Road there is a thick stand of native grasses, dominated by little bluestem (*Andropogon scoparius*), that proclaim their American origin with their attractive rose-tawny autumn color. It is the creeping pink phlox (*Phlox subulata*), however, that has given the hill its name. From late April until mid-May it paints the slope above Dismal Run and fills the air with its delicate and delightful perfume.

Serpentine barrens are scattered over southeastern Pennsylvania, and the part of our local barrens that supports the pink phlox is quite small. But we know of no other barren that is owned by an arboretum, and so safe from exploitation. Other barrens have been built on and quarried for the curious "greenstone," once much desired in Delaware and Chester counties for constructing barns, churches, houses and other buildings.

Other plants that survive in the thin soil, free from the competition of large trees, are an attractive chickweed and a violet that are typical of the barrens, a senecio, the low shrub New Jersey tea (*Ceanothus americanus*), and the small blackjack oak (*Quercus marilandica*). Unfortunately the black locust (*Robinia pseudoacacia*), originally not native to this part of Pennsylvania, has come in, and this we strive continually to control. Otherwise it would spread by suckers to form a dense thicket, shading out the phlox and other wild flowers of this special small area.

Serpentine, the most important component of serpentinite, is high in magnesium and almost entirely lacking in lime, nitrates, phosphates and potash. One of our neighbors, whose property is on the edge of Pink Hill, found that there were many acid-loving plants, including rhododendrons, that she could not grow. Nevertheless, the pinxter flower (*Rhododendron nudiflorum*) and the deerberry (*Vaccinium stamineum*) can be found down near Dismal Run. The tiny bluets or Quaker ladies (*Houstonia caerulea*) supposed to require a moderately acid soil grows along the northern part of the slope near Painter Road.

Where deeper soil has developed over the serpentinite there is woodland. But although there is a good mixture of hardwoods on this part of the Barrens, a series of drought years kills a noticeable number of trees. On each side of Barren Road these dead trees are scattered through the woods. Still,

continued

at the western corner of Barren and Painter Roads there are several large white oaks that have endured for many decades. Perhaps they are growing in a site with a better supply of moisture.

On the high ground toward the northeasterly part of the Arboretum, near Black Hawk Spring, there is a small area underlain by granite gneiss, which has produced, in combination with leaching rains, a highly acid soil. Here the native flora includes acid-tolerant oaks, blueberries, and other plants that thrive in acid soils.

The drainage condition of any soil often decides what will grow on it. Along Dismal Run between Painter Road and Rocky Run there is an area of low swampy ground. Through this little valley there are many red maples (*Acer rubrum*) which, when they bloom in March, seem to fill the woods with a red mist. The extreme easterly portion of the Arboretum property is a small area across which Ridley Creek

meanders. This is a floodplain of deep alluvial soil, deposited through the ages.

Springs on our property are numerous. Black Hawk Spring on Barren Road is known for miles around for its splendid and unfailing water. Three houses on the land were built over springs. Two are now in ruins, but the spring in the third supplies the Arboretum employee who lives there with an adequate supply of fine water.

On South Farm there is a good spring, sheltered by the ruins of a spring house, and all who visit the Arboretum know the spring house below Lachford Hall. There are other places where flourishing colonies of skunk cabbage seem to indicate supplies of water not far below the surface.

It is the intention of the trustees to keep the old woodland and Pink Hill in a natural state, but to check and push back the invading plants that are not native, such as Japanese honey-

suckle, *Rosa multiflora* and *Paulownia tomentosa*. The vegetation that naturally occurs on each type of soil will remain, each community to tell its own story. There is left a large enough area to give interesting plantings of cultivated trees and shrubs. Visitors to the Tyler Arboretum will find an attractively diversified terrain, and a network of quiet paths to lead them through shady woods and sunny fields away from the world of the city and suburbs into the world of the out-of-doors.



by Gertrude S. Wister

Thanks are due to Dr. Edgar T. Wherry, Professor Emeritus of Botany, University of Pennsylvania, and Dr. Robert B. Gordon, Professor Emeritus of Sciences, West Chester State College, for the papers they have written on the rocks and soils of the Tyler Arboretum which were the basis of this article.

classified ads

BEYOND THE PINK FLAMINGO . . . waits a beautiful collection of "Eternity Lead" lawn and garden sculpture from George Robertson & Sons. The famous collection is created by top sculptors and produced in limited edition by Kenneth Lynch & Sons, of Wilton, CT. Many are suitable for indoor garden, patio, or pool. Many include pedestals, sundials, or are piped for water. All make for a delightful and distinctive garden. **George Robertson & Sons, Inc., 8501 Germantown Avenue, Chestnut Hill, PA. CH 2-6000.**

Looking for outdoor lighting? Nightscaping® is dramatic — safe and economical. Our staff has been trained to develop the finest low-voltage outdoor lighting effects for your home and garden. For more details see J. Franklin Styer Nurseries, Concordville, PA. Tel. GL 9-2400.

The Plants of Southern New Jersey. Reprint of Witmer Stone's monumental work on the flora of the New Jersey Pine Barrens. 944 pages, hardbound, illustrated. \$30.00.

Order From: Quarterman Publications, Inc., 5 South Union Street, Lawrence, MA 01851.

SIT IN COMFORT on "The Garden Stradler" as you move about your flower and vegetable garden. Move over rows or alongside borders as you plant, weed, thin and pick vegetables and flowers. Write C. W. MICHAELS, Dept. A, New Albany Road, Moorestown, NJ 08057.

HILL HARDWARE, 8615 Germantown Avenue, invites you to visit an outstanding display of rustproof, weatherproof, high quality garden furniture. A wide selection of styles and colors.

WANTED: Customers for superior varieties such as: *Acer rubrum*, *Cercidiphyllum japonicum*, *Cryptomeria japonica nana*, *Enkianthus campanulata*, *Ilex 'Nellie Stevens'*, *Juniperus chinensis sargent*, *Picea abies nidiformis*, *Pinus densiflora umbraculifera*, *Stewartia pseudo-camelia*, *Styrax obassia*. All and more available from Rose Valley Nurseries, 684 S. New Middletown Road, Media, PA 19063. Telephone Ben Palmer, TR 2-7206.

HERBAL LUNCHEON or supper and garden visit. July 1 to September 15 at Longview Farm for the benefit of the National Herb Garden, Washington, DC. Reservations are limited to groups of a minimum of 10 or a maximum of 40. For details call Mr. or Mrs. George A. Reed, Jr., (215) 827-7614 between 9:00 & 10:00 a.m. or after dark.

LORD AND BURNHAM GREENHOUSES for the care, cultivation and protection of tender growing plants; painstakingly custom designed to your specific horticultural needs, flawlessly erected, and delivered on time every time. Inquiry welcome. QED, INC., Villanova, PA. 688-4825.

Hundreds of satisfied green tenants . . . From the plant people who build greenhouses . . . Not builders who are green about plants.

MAIN LINE GREENHOUSE SERVICE. Complete and professional care by week, month or year. Includes individual plants for travelers. Barnes Foundation graduate. Member of Pa. Horticultural Society, Orchid Societies and Begonia Society. Reasonable. LA 5-8098.

A plant nursery with over 5,000 different representations of the unusual in Rhododendron, Azaleas, Dwarf Conifers, Bamboos, Exotic Japanese Maples, Ornamental Grasses, Iris, Hostas, Peonies, Sempervivums, Alpines and perennials. Come to PALETTE GARDENS halfway between Quakertown and Coopersburg on Route 309. Mail order catalog available for 50¢. Landscape designer services available. Open 7 days a week. 26 W. Zion Hill Road, Quakertown, PA 18951.

Specialists in Japanese, City, Naturalistic gardens, featuring volcanic rock, ornamental pools, waterfalls, terraces. Plantings designed by Landscape Architectural Service Department, installed by expert landscapers. J. Franklin Styer Nurseries, Inc., Concordville, PA 19331. Telephone GL 9-2400.

Going away? Responsible couple (Franklin and Marshall graduate, sophomore medical student; Agnes Irwin alumna, attended Hollins College) will care for your home, plants, greenhouse, garden, pets. Children-sitting also available; references. Further information: (215) 446-3111.

* (Issued bimonthly: September/October, November/December, January/February, March/April, May/June, July/August. Listing shows only first month listed on bimonthly issue date.)

SUBJECTS

A

Autumn Begins with *Nyssa sylvatica* — Wells..... Sept., 28
Azalea Gardens at Friends Hospital, The — Draper..... March, 3

B

Bamboo, Heavenly: Neglected in the Delaware Valley — Rogers..... Nov., 12
Basic Christmas Wreath, The — Lindemann..... Nov., 8
Begonia 'Robert Shatzer' — Kolb..... March, 31; *Begonia sutherlandi* — Ballard..... Nov., 33
Bending Nature to Art — Semanko..... Nov., 21
Books and the Green World Plant Explorers and Their Books... Sept., 30; Periodicals: Keeping Up with Changes... Nov., 30; A Very Special Collection... Jan., 22; Travel... March, 20; Roses in Depth... May, 27
Bowman's Hill, Welcome to — Miles..... May, 24

C

Cacti without Sunshine — Lee..... Sept., 14
Cedar in Lebanon with Fair Branches, and with a Shadowing Shroud — Wister..... Jan., 28
Cherry, Loveliest of Trees — Wister..... March, 23
Chimonanthus praecox — Blum..... March, 26
Christmas at the Pennsylvania Horticultural Society... Nov., 2; Christmas Trees — Ballard..... Nov., 1
Closing the Generation Gap in a Food-for-the-Year Garden — Boorse... Sept., 8
Colchicum . . . The Potent Flower — Wister..... Sept., 26
Commentary — Wister..... March, 1
Compost Heap, The — Ballard..... July, 3
Conifers, Some Grand — Blum..... Jan., 25
Container Garden, The Elevated — Joiner..... May, 13
Containers, Lettuce (et al.) in — Archer..... May, 19
Cooperating in the Greenhouse — Roe..... Sept., 22

D

Daffodils, an Investment in Gold, Naturalizing — Lapp..... May, 20
Davallia bullata mariesi — Salgado..... Jan., 32
Delaware Valley Geology — Wherry..... July, 1
Digging for Information — Lindemann..... Bimonthly
Dogwoods and Some of Their Kin, Flowering — Wister..... May, 30
Dragons in Chestnut Hill — Blum..... Nov., 26

E

Earth, The Good — Flannery..... July, 6
Echinopsis antisii — Zutter..... Sept., 32
Editorials: The Way We Were; the Way We Will Be... Sept., 1; Christmas Trees: The Right Tree in the Right Place at the Right Time... Nov., 1; Bureaucracy: Are Ornamentals Expensible?... Jan., 1; Who is a Vandal?... May, 1
Elevated Container Garden, The — Joiner..... May, 13
Espaliers: for Ornamentation and Fruit — Zimmerman..... Jan., 13
Exotics from Chicken-Itza to Merion — Gorson..... Nov., 16

F

Fallow, A Productive: Green Manure — Gyer..... July, 18
Flowering Dogwoods and Some of Their Kin — Wister..... May, 30
Food-for-the-Year Garden, Closing the Generation Gap in a — Boorse... Sept., 8
Four Unusual Seed Mosaics — Shaffer..... Jan., 18
Friends Hospital, Azalea Gardens at — Draper..... March, 3
Fruit of the Year, Tomatoes... May, 6
Fuchsia Bohstedti — Bonham..... Jan., 33

G

Gardening on Rescued Soils — Koller..... July, 19
Garland, Vines as Urban — Koller..... March, 15

Geology, Delaware Valley Wherry..... July, 1
Good Earth, The — Flannery..... July, 6
Greenhouse, Cooperating in the — Roe..... Sept., 22
Green Manure, A Productive Fallow — Gyer..... July, 18
Growing Plants without Soil — Zutter..... July, 22

H

Heavenly Bamboo: Neglected in the Delaware Valley — Rogers..... Nov., 12
Humus from the Dump — Collins..... July, 26
Hybridize Lilies, Let's — Windus..... March, 12

L

Let's Hybridize Lilies — Windus..... March, 12
Lettuce (et al.) in Containers — Archer..... May, 19
Lettuce Under Lights — Elbert..... May, 18
Lettuce, Year-Round — Brubaker..... May, 17
Lights, Lettuce Under — Elbert..... May, 18
Lights, the Long and Short of — Brubaker..... Sept., 20
Lilacs by the Tree-Full — Blum..... May, 32
Lilies, Let's Hybridize — Windus..... March, 12
Lilium canadense — Happich..... March, 31
Long and Short of Light, The — Brubaker..... Sept., 20
Loveliest of Trees, The Cherry — Wister..... March, 23

M

Mandragora officinarum — Balick..... Sept., 33
Morris Arboretum, the Soils of, a Fortuitous Choice — Brandes..... July, 28
Morris Arboretum: Autumn Begins with *Nyssa sylvatica*... Sept., 28; Dragons in Chestnut Hill... Nov., 28; Some Grand Conifers... Jan., 25; *Chimonanthus praecox*... March, 26; Lilacs by the Tree-Full... May, 32; Gardening on Rescued Soils... July, 19
Mosaics, Four Unusual Seed — Shaffer..... Jan., 18

N

Narcissus, Paper White — McCoy..... Nov., 32
Naturalizing Daffodils, an Investment in Gold — Lapp..... May, 20
Nature to Art, Bending — Semanko..... Nov., 21
Nyssa sylvatica, Autumn Begins with — Wells..... Sept., 28

O

Organic Gardening in Perspective — Thoroughgood..... March, 28
Oriental Spruce, The — Wister..... Nov., 28
Ornamentals Expensible, are — Styer..... Jan., 1

P

Paper White Narcissus — McCoy..... Nov., 32
Pine Barrens, Soils of the — Scalfani..... July, 12
Plant Explorers and Their Books — Hall..... Sept., 30
Productive Fallow, A: Green Manure — Gyer..... July, 18

R

Rake's Progress at Crefeld Street, The — Steijn..... Jan., 30
Rescue (Wildflowers) — Gyer..... Sept., 2
Rhododendrons, John Wister and His — West..... March, 8

S

Seed Mosaics, Four Unusual — Shaffer..... Jan., 18
Soil, Growing Plants without — Zutter..... July, 22
Soil O & A — Lindemann..... July, 14
Soil Testing, Guessing is Not Good Enough, Try — Hinish..... July, 16
Soils and Springs of the John J. Tyler Arboretum — Wister..... July, 30
Soils are Not Alike, Why All — Alderfer..... July, 11
Soils of the Morris Arboretum, A Fortuitous Choice — Brandes..... July, 28
Soils of the Pine Barrens — Scalfani..... July, 12
Some Grand Conifers — Blum..... Jan., 25

South Jersey Garden, A — Bruno..... May, 2
Spruce, The Oriental — Wister..... Nov., 28
Streptocarpus 'Constant Nymph' — Stephenson..... Nov., 32
Stirling, Mrs. E. C. — Landt..... March, 32

T

Terrarium, Woodland? . . . Not a Woodland . . . a 7 Foot — Judd..... Jan., 8
Tomatoes . . . the Fruit of the Year... May, 6
Try Soil Testing, Guessing is Not Good Enough — Hinish..... July, 16
Tyler Arboretum: Colchicum . . . The Potent Flower... Sept., 26; The Oriental Spruce... Nov., 28; A Cedar in Lebanon with Fair Branches, and with a Shadowing Shroud... Jan., 28; Loveliest of Trees, the Cherry... March, 23; Flowering Dogwoods and Some of Their Kin... May, 30; Soils and Springs of the John J. Tyler Arboretum... July, 30

U

Ulmus davidiana pygmae — Raden..... Sept., 32

V

Very Special Collection, A — Morris..... Jan., 22
Vines as Urban Garlands — Koller..... March, 15
Vista Enhancement Through Progressive Realization — Apps..... Jan., 3

W

Welcome to Bowman's Hill — Miles..... May, 24
Why All Soils are Not Alike — Alderfer..... July, 11
(Wildflowers). See "Rescue."
Wister, John and His Rhododendrons — West..... March, 8
Woodland? . . . Not a Woodland . . . a 7 Foot Terrarium — Judd..... Jan., 8
Wreath, The Basic Christmas — Lindemann..... Nov., 8

AUTHORS

A

Alderfer, R. B. — Why All Soils are Not Alike..... July, 11
Apps, Darrel — Vista Enhancement Through Progressive Realization... Jan., 3
Archer, Charlotte — Lettuce (et al.) in Containers..... May, 19

B

Balick, Michael — *Mandragora officinarum*..... Sept., 33
Ballard, Ernesta D. — Editorial... Nov., 1; *Begonia sutherlandi*... Nov., 33; The Compost Heap... July, 3
Bell, Léonie — Books and the Green World. Roses in Depth... May, 27
Blum, Susan B. — Dragons in Chestnut Hill... Nov., 26; Some Grand Conifers... Jan., 25; *Chimonanthus praecox*... March, 26; Lilacs by the Tree-Full... May, 32
Bonham, J. Blaine — *Fuchsia bohnstedti*..... Jan., 33
Boorse, David G. — Closing the Generation Gap in a Food-for-the-Year Garden..... Sept., 8
Brandes, Gordon A. — The Soils of the Morris Arboretum, A Fortuitous Choice..... July, 28
Brubaker, M. M. — The Long and Short of Light... Sept., 20; Lettuce Year-Round... May, 17
Bruno, Barbara — A South Jersey Garden..... May, 2
Byrne, Jean — Editorial..... Sept., 1

C

Collins, Edythe — Humus from the Dump..... July, 26

D

Draper, H. Richard, III — Azalea Gardens at Friends Hospital... March, 3

E

Elbert, George — Lettuce Under Lights..... May, 18

F

Flannery, Roy L. — The Good Earth..... July, 6

G

Gorson, Millie — Exotics from Chicken-

Itza to Merion..... Nov., 16
Gyer, Janet Oliver — Rescue... Sept., 2
Gyer, John — A Productive Fallow Green Manure..... July, 18

H

Hall, Elizabeth C. — Books and the Green World: Plant Explorers and Their Books..... Sept., 30
Happich, Muriel — *Lilium canadense*..... March, 31
Hinich, W. Wayne — Try Soil Testing, Guessing is Not Good Enough... July, 16

J

Joiner, Doris — The Elevated Container Garden..... May, 13
Judd, William C. — Woodland? . . . Not a Woodland . . . a 7 Foot Terrarium..... Jan., 8

K

Kolb, Nancy D. — Begonia 'Robert Shatzer'..... March, 31
Koller, Gary — Vines as Urban Garlands... March, 15; Gardening on Rescued Soils... July, 19

L

Landt, Gustave E. — Mrs. E. C. Stirling..... March, 32
Lapp, Kitty — Naturalizing Daffodils, an Investment in Gold... May, 20
Lee, Henry F. — Cacti without Sunshine..... Sept., 14
Lindemann, Edward — Digging for Information... Bimonthly; The Basic Christmas Wreath... Nov., 8; Soil O & A... July, 14

M

McCoy, Noreen — Paper White Narcissus..... Nov., 32
Miles, Bebe — Who is the Vandal?... May, 1; Welcome to Bowman's Hill... May, 24
Morris, Julie — Books and the Green World: Keeping Up with Changes... Nov., 30; A Very Special Collection... Jan., 22; Travel... March, 20

R

Raden, Lee M. — *Ulmus davidiana pygmae*..... Sept., 32
Roe, Emma Matheson — Cooperating in the Greenhouse..... Sept., 22
Rogers, Charles W., Jr. — Heavenly Bamboo: Neglected in the Delaware Valley..... Nov., 12

S

Salgado, Nancy J. — *Davillia bullata mariesi*..... Jan., 32
Scalfani, Carol — Soils of the Pine Barrens..... July, 12
Semanko, Edward A. — Bending Nature to Art..... Nov., 21
Shaffer, Priscilla-Gene W. — Four Unusual Seed Mosaics..... Jan., 18
Steijn, Patricia — The Rake's Progress at Crefeld Street... Jan., 30
Stephenson, Libby — Streptocarpus 'Constant Nymph'..... Nov., 32
Styer, J. Franklin — Editorial... Jan., 1

T

Thoroughgood, Carolyn — Organic Gardening in Perspective..... March, 28

W

Wells, Ellen V. P. — Autumn Begins with *Nyssa sylvatica*..... Sept., 28
West, Franklin H., M.D. — John Wister and His Rhododendrons... March, 8
Wherry, Edgar T. — Delaware Valley Geology..... July, 1
Windus, Wallace — Let's Hybridize Lilies..... March, 12
Wister, Gertrude S. — Colchicum . . . The Potent Flower... Sept., 26; The Oriental Spruce... Nov., 28; A Cedar in Lebanon with Fair Branches, and with a Shadowing Shroud... Jan., 28; Loveliest of Trees, the Cherry... March, 23; Flowering Dogwoods and Some of Their Kin... May, 30; Soils and Springs of the John J. Tyler Arboretum... July, 30
Wister, John C. — Commentary..... March, 1

Z

Zimmerman, L. Wilbur — Espaliers: For Ornamentation and Fruit... Jan., 13
Zutter, Hans A. — Growing Plants without Soil..... July, 22
Zutter, Peter — *Echinopsis antisii*..... Sept., 32

